

## DOCUMENT RESUME

ED 225 141

CS 006 992

AUTHOR McNinch, George H., Ed.  
TITLE Reading in the Disciplines. Second Yearbook of the American Reading Forum.  
INSTITUTION American Reading Forum.  
PUB DATE 82  
NOTE 129p.; Small print on most pages may not reproduce.  
PUB TYPE Collected Works - Conference Proceedings (021)  
EDRS PRICE MF01/PC06 Plus Postage.  
DESCRIPTORS Adults; \*Content Area Reading; Elementary Secondary Education; Higher Education; Language Arts; Mathematics; Older Adults; \*Reading Comprehension; \*Reading Instruction; Reading Research; Reading Skills; Reading Teachers; Sciences; Social Studies; Teaching Methods

## ABSTRACT

Papers delivered at the second American Reading Forum are collected in this yearbook. While all of the essays focus on the theme of reading in the disciplines, many of them respond to a preceding essay. The essays and reactions cover a variety of topics, including the following: (1) a qualitative analysis of reading instruction in low level language arts and reading classes in high school, (2) assessment of middle school content text difficulty, (3) vocabulary instruction in mathematics, (4) glossing for improved comprehension, (5) use of student-generated questioning procedures to stimulate and promote reading comprehension skills of students, (6) mnemonics, (7) cognitive process instruction in science, (8) using sports to stimulate critical thinking, (9) the relationship of writing to aspects of intelligence and reading, (10) reading courses for teachers in the disciplines, (11) literary versus scientific reading in college, (12) developing cognitive relationships in social studies through trade books, (13) post-schooling concerns for reading in the disciplines, (14) training administrators in the supervision of content area reading teachers, (15) reading and the elderly, and (16) critical reading, reasoning, and consumer decision making.  
(HTH)

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## READING IN THE DISCIPLINES

### SECOND YEARBOOK OF THE AMERICAN READING FORUM

1982

Edited by  
George H. McNinch  
West Georgia College

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Distributed by  
THE AMERICAN READING FORUM  
Aderhold Hall

University of Georgia  
Athens, Georgia

PRINTED IN THE UNITED STATES OF AMERICA  
BY  
THOMASSON PRINTING AND OFFICE EQUIPMENT COMPANY, INC.  
Carrollton, Georgia

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## SENTENCE-COMBINING IMPROVES WRITING— CAN IT IMPROVE READING COMPREHENSION?

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Sentence-combining (S-C) as an instructional technique involves combining several kernel sentences into a longer, more complex sentence containing adjective and adverbial modifiers, phrases, dependent clauses, etc. S-C has recently been proposed as an instructional technique useful in improving student performance in writing and in reading comprehension. Research into the efficacy of this technique has already been conducted in the disciplines of English, social studies, science, and foreign languages. Logically, sentence-combining would appear to be applicable to any discipline which involves writing and reading skills.

The purposes of this paper are: (a) to provide background information containing an overview of the theoretical base, an examination of the initial research in the field, and a definition and illustration of S-C as an instructional technique; and (b) to summarize the results and analyze the methodology of the empirical research from 1968 to 1981, including data from a meta-analysis of the studies.

### Background Information

S-C has its roots in the generative-transformational (g-t) theory of grammar as developed by Chomsky (1957). Two particular aspects of g-t theory led to the initial research in S-C. Chomsky hypothesized that there were two levels of language, the "surface structure" and the "deep structure." The surface structure consisted of the linear sequence of words, phrases, and clauses which constituted a sentence; the deep structure consisted of one or more underlying propositions, or units of meaning, which the surface structure represented. The relationship between deep structure and surface structure was not one-to-one since underlying propositions could be represented by a number of different surface structures. Secondly, Chomsky described the way in which surface and deep structures were related through transformations. One type of transformational rule designated the operations affecting two underlying propositions so as to join them or embed one in the other. O'Donnell, Griffin and Norris (1967) referred to these operations as sentence-combining transformations, because the effect was to produce one sentence where otherwise there would have been two.

Although Chomsky provided the theoretical base for S-C, it was Hunt (1965) who supplied the impetus and initial methodology for much of the subsequent research. In order to provide a systematic procedure for the quantitative analysis of syntactic structures, Hunt devised the "minimal terminable unit," or "T-unit," which he defined as "one main clause plus the subordinate clauses attached to or embedded within it" (p. 49). In his study of syntactic development in the writing of schoolchildren between grades 4 and 12 and in the writing of skilled adults, Hunt found that older writers used a much larger number of sentence-combining, sentence-embedding transformations per T-unit than did younger writers. Although Hunt did not attempt to validate S-C as an instructional strategy, he suggested the possibility that a "sentence-building program" could be designed to promote the attainment of the developmental stages in syntactic maturity which he had identified.

Following Hunt's suggestion, Mellon (1969) explored the effects of transformational S-C practice on the development of syntactic fluency in English composition of seventh-graders. However, Mellon also gave his experimental group instruction

in g-t grammar terminology. Thus, while the results did indicate a growth in syntactic fluency, the relative contribution of learning the g-t terminology and of the practice in S-C to that growth was not clear.

In order to examine the effects of S-C practice alone, O'Hare (1973) disposed of the teaching and use of grammatical terminology in performing combining operations by devising a method of providing written cue words for selected types of S-C transformations. O'Hare's experimental group of seventh graders experienced highly significant growth at the .001 level on all measures of syntactic maturity.

The two types of S-C exercises most used since 1973 have been modeled after the methods proposed by O'Hare (1973) and Strong (1973). O'Hare's method has been designated as "signaled" S-C exercises. In the example which follows, the A form is the S-C problem and the B form is the acceptable student answer.

- A. Edna was amazed at SOMETHING.  
Ron had forgotten the combination. (THE FACT THAT)
- B. Edna was amazed at the fact that Ron had forgotten the combination.
- A. Julio should admit SOMETHING.  
He was there. (THAT)
- B. Julio should admit that he was there. (O'Hare, 1975, p. 20)

As an alternative to O'Hare's "signaled" method, Strong (1973) developed what he termed "open" S-C exercises. Kernel sentences were presented in clusters but without signals to indicate the particular transformations to be used, or even which of the sentences to serve as the base clause. Students were told to combine the kernel sentences into complex sentences; versions generated by different students were then compared. Here is an example.

### ROCK CONCERT

1. The singer was young.
2. The singer was swarthy.
3. He stepped into the spotlight.
4. The spotlight was red.
5. His shirt was unbuttoned.
6. The unbuttoning bared his chest.
7. Sound ballooned around him.
8. The sounds were of guitars.
9. The sounds were of drums.
10. The sounds were of girls.
11. The girls were screaming.

One student might generate the following: "The singer, who was young and swarthy, stepped into the red spotlight. His unbuttoned shirt bared his chest. Sounds of guitars, drums, and screaming girls ballooned around him." Another student might combine all 11 sentences into one sentence: "As the sounds of guitars, drums, and screaming girls ballooned around him, the young, swarthy singer stepped into the red spotlight, his shirt unbuttoned, baring his chest" (Strong, 1976, p. 62-63).

### Review of Research

The literature search resulted in locating 20 studies<sup>1</sup> reported from 1968 to 1981 which had used S-C as a treatment to improve written composition, reading comprehension, or both. Fourteen of the studies were concerned with the effect of S-C training on written composition only, with four containing measures of both writing and reading. Only two studies examined S-C's effect on reading comprehension alone.

Of the 20 studies examined, 19 contained subjects which ranged in age from grade 4 through college freshmen, and one study used Chinese students of unspecified adult level. Eight of the studies used subjects in grades 7-9, seven used college freshmen, and three used subjects in grades 4-6. One researcher,



Fisher (1973) used subjects in grades five, seven, and nine.

The studies generally suffered from several validity threats common to educational studies conducted in field settings. The samples used were, almost always, selected on the basis of convenience and/or availability. In fact, 17 of the studies did not specify how the samples were chosen, and in only one (Mellon, 1969) was any serious attempt made to claim representativeness.

Another validity threat common to this research was the method of assignment to treatment and comparison groups. Three of the studies used a single group design, eight used intact classes, three used a matched pair technique, one used matched groups, and only five used a random assignment technique.

The statistical technique represented most often in the twenty studies was the *t* test. It was used by nine of the researchers while ANOVA was used by four and ANCOVA by five. One study used a regression analysis and one did not specify the statistical procedure used. A clear weakness in relating statistical procedure to overall design is seen when one finds that, of the eight researchers using intact groups, three used inappropriate statistical procedures, i.e., *t* test or ANOVA. The others used the appropriate technique, ANCOVA.

The treatment time was also of interest. In several studies it was rather difficult to estimate. In only one study (Ney, 1976), however, was it not possible to make some calculation. The length of the treatment ranged from 20 minutes to 8 months, although most were more than 10 weeks. It was not possible to compute treatment times in the same units of measure so that more precise comparisons could be made. Also, it should be noted that 17 of the 20 treatments occurred within regular classrooms, decreasing the threat of novelty/description effects when applying these results to classroom practice.

In order to synthesize the results of this research a meta analysis was completed. Meta analysis is a procedure first suggested by Gene Glass in which the results of the studies were converted to effect sizes (ES). The ES is an expression which compares the gain made by the treatment group to that made by the comparison group. The simplest mathematical

expression of ES is:  $ES = \frac{\bar{X}_T - \bar{X}_C}{SD_C}$  (McGaw & Glass, 1981).

Thus, an ES of .73 would indicate that the treatment group made .73 standard deviations of progress more than the comparison group, while an ES of (-.73) would indicate the same amount of progress, with the comparison group exceeding the treatment group. It should be noted that in several of the following analyses the number of ES's were too small to provide valid results. However, the analysis was completed because the results could be valuable in generating hypotheses regarding the comparisons.

Table 1 shows the results of the computation of ES for several groups of studies. The purpose of the first group of ES's for writing and reading was to ascertain the overall effects of S-C as a treatment. To accomplish this, *t* tests for the differences between a sample mean and a population mean were computed. Since both of the *t* values related to writing were clearly less than the acceptable .05 level of significance, it seems safe to conclude that S-C has been effective as a measure to improve written composition. Also, the *t* value for reading with immediate recall was significant. However, the number of ES's available for analysis of the delayed measures of writing and for both reading measures was rather small, suggesting the need for continuing substantiation of S-C effectiveness in these areas.

A second question which was of interest was whether or not certain writing and/or reading measures resulted in ES's which were different from each other. Four types of writing measures were compared through ANOVA and a non-significant *F* ratio resulted. Two types of reading measures were also examined,

and it was found that the mean ES of the cloze measures was not significantly different from the mean ES of the standardized test measures. In both analyses the number of the ES's was small.

When a comparison of the three varying grade level classifications was made through ANOVA, followed by a Duncan Multiple Range Test, it was found that the mean ES for Grades 7-9 was significantly higher than that of the other two levels. There was no difference between the means of the College Freshmen and the Below Grade 7 classifications.

The final comparison was among the various types of comparison groups used, and it resulted in a non-significant *F* ratio. Here, again, the small number of ES's for some types of design would lead one to question the validity of this *F* ratio.

In summary, it appears that S-C has been shown to have a positive effect on written composition when the criterion measure is taken immediately upon completion of the treatment. The effect of S-C on reading comprehension is not as clear. While the mean ES was significant, there were only five studies and 17 ES's available for analyses and, of the 17 ES's, only six were significant. Several individual researchers who used standardized tests suggested that these tests did not measure the types of comprehension most likely to be affected by S-C practice. The research techniques used in these studies often failed to exercise rigorous controls over internal validity threats. Of the twenty studies examined, only ten used designs which would control adequately for internal threats. These ten studies used either random assignment to groups or intact groups with an ANCOVA statistical analysis. While it would be very desirable to achieve more representative samples, it seems unlikely that this weakness will be remedied in future research because of the realities of conducting research in schools. However, it would behoove future researchers to provide more complete descriptions of the samples used, regardless of the method of selection.

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<sup>1</sup>A list of the 20 studies may be obtained from the authors.

Table 1

## RESULTS OF EFFECT SIZE FOR SELECTED VARIABLES IN S-C RESEARCH

| Variable                       | XES   | St. Dev. | No. ES | No. Studies | Results of Analysis | df p level        |
|--------------------------------|-------|----------|--------|-------------|---------------------|-------------------|
| Writing: Immediate Recall      | .764  | .736     | 84     | 16          | t = 9.55            | df = 83; p < .001 |
| Writing: Delayed Recall        | .649  | .050     | 7      | 3           | t = 5.41            | df = 6; p < .01   |
| Reading: Immediate Recall      | .357  | .545     | 17     | 5           | t = 2.75            | df = 16; p < .02  |
| Reading: Delayed Recall        | .179  | .240     | 8      | 1           | t = 2.08            | df = 7; p < .10   |
| Writing Measures               |       |          |        |             |                     |                   |
| Commonly Used Words/<br>T Unit | .975  | .800     | 16     | 9           | F = 1.54            | df 3, 47; p = NS  |
| Words/Clause                   | .617  | .472     | 17     | 9           |                     |                   |
| Clauses/T Unit                 | .600  | .718     | 11     | 5           |                     |                   |
| Holistic                       | 1.186 | 1.057    | 7      | 5           |                     |                   |
| Reading Measures               |       |          |        |             |                     |                   |
| Cloze                          | .504  | .814     | 4      | 3           | F < .10             | df=1,11; p = NS   |
| Standardized Tests             | .341  | .341     | 9      | 4           |                     |                   |
| Grade Level of Sample          |       |          |        |             |                     |                   |
| Below Grade 7                  | .521  | .421     | 12     | 3           | F = 7.19            | df 2, 89; p < .01 |
| Grades 7-9                     | 1.075 | .929     | 36     | 6           |                     |                   |
| College Freshmen               | .536  | .394     | 44     | 7           |                     |                   |
| Type of Design                 |       |          |        |             |                     |                   |
| No Comparison Group            | .863  | .645     | 7      | 2           | F = 1.52            | df 4, 107; p = NS |
| Matched Pairs                  | 1.079 | .965     | 10     | 3           |                     |                   |
| Random Assignment              | .657  | .870     | 41     | 5           |                     |                   |
| Intact (ANCOVA)                | .526  | .475     | 37     | 5           |                     |                   |
| Intact (ANOVA or t)            | .559  | .269     | 17     | 3           |                     |                   |



# A DESCRIPTION OF INSTRUCTION IN THE READING OF ASSIGNED MATERIALS IN EIGHTH GRADE SOCIAL STUDIES AND LANGUAGE ARTS CLASSROOMS

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This study is an outgrowth of two papers presented at the American Reading Forum in December, 1980. The first was a study (Hesse, Bullock, and Chin, 1980) in which a product-centered approach to reading comprehension was discussed. This approach focused not upon a series of skills, but on "those products of reading that teachers will accept as evidence that the material is being read and students are gaining meaning from the material." Reading for meaning is seen as active reading, and the behaviors of students so engaged are defined as active reading behaviors. This follows Goodman's model (1970) of reading that looks at meaning as the end product of the reading process.

The authors cite important reasons for acceptance of this approach to content area reading. First, this approach allows teachers to be more specific about what they need to do in order to help students with reading the material. If they know what behaviors to expect from a student who is reading, teachers will be better able to help the student learn to exhibit those behaviors. For example, if the ability to summarize can be accepted as evidence that the student has read and understood a passage, the teacher can (1) observe whether students can summarize, and (2) devise strategies for helping those who cannot. "These products of active reading would appear to be more manageable and remove some of the mysticism from the teaching of reading in the content areas" (Hesse, Bullock, and Chin, 1981).

In the second paper (Hesse and Slinger, 1980), a model was developed by which baseline data could be collected with regard to the amount and type of active reading behaviors (pupil reading pursuits) that might be observed in the content area classroom. "At the present time, reading educators and school administrators lack a clear set of expected/desired student behaviors in content area reading. In addition, we have no way of assessing the teaching of these reading behaviors. Hopefully, the framework we describe will be a step toward gathering data that will be helpful in reviewing and setting defensible policy in secondary content area reading instruction" (Hesse and Slinger, 1981).

## Reason for the Study

One of the major concerns of education continues to be the apparent decline in reading competency among high school graduates. This concern has led to an increased emphasis on "back to basics," and has served to expand the area of responsibility for reading instruction from the exclusive domain of the elementary school reading class to every situation where reading assignments are required. Since these situations include secondary classrooms, a new emphasis has been placed on reading at the secondary level.

Twenty-eight states now mandate that preservice instruction for all secondary teachers shall include attention to reading in the content area (Thomas and Simpson, 1979). These mandates are based on the following assumptions:

1. The range of reading levels in a given classroom can span many grade levels. Few schools can afford to hire reading teachers to accommodate every student whose skills need improvement. The most economical way of providing

this instruction is to include it in the students' regular classes.

2. Even students who can decode every word in their text may sometimes fail to grasp the meanings of new and unfamiliar concepts that are presented in the reading assignment. Each subject area contains a vast number of concepts that the student need to learn. The content area teacher cannot hope to teach them all. The best a teacher can do is to help students acquire the skills necessary for independent learning.
3. Reading skills taught in the laboratory setting do not automatically transfer to the situation where they are to be used. Each skill should be taught or reinforced in the content area reading assignment where it is needed.

However, as Palmer (1975) suggests, many teachers hold the view that "the teaching of reading in the content area is an esoteric mystery to be solved only by the reading specialist" (p. 43). These teachers believe that before they can help students learn to read, they must be trained as reading specialists. Secondary teachers often view reading as a set of skills that must be taught prior to content area instruction. This view allows them to see only the remedial aspect of reading instruction, and since they have not usually been trained in remedial reading, they feel inadequately prepared to meet the challenge. This lack of confidence in their ability to teach reading, coupled with the increasing demands for reading instruction, can create negative attitudes on the part of these teachers which, in turn, can affect student performance. A change in these attitudes may occur when teachers learn to view reading as a tool needed to facilitate the learning of content, and not as an intrusion into their own domain. The building of competence in reading instruction and the improvement of attitude can come about through well-designed inservice programs. However, before these programs can meet the needs of teachers, they must be based on a knowledge of what is presently happening in the secondary content area classrooms. Educators must know the specific things that teachers do to assist students in reading content area assignments. It was in response to this need for information about secondary reading instruction that this study was designed.

Since there was no effective instrument available, one was designed for this study which is capable of collecting information about the kind, quantity and duration of content area reading activities that might be observed in the secondary classroom.

## Building the Framework

*Step 1.* In order to build a framework it was first necessary to define content area reading in terms of classroom activities. Initially, a series of classrooms were observed and all activities recorded. These activities were placed into categories labeled reading pursuits, content instruction, and non-instruction. Reading pursuits were then sub-grouped as active reading pursuits, passive reading pursuits, and oblique reading pursuits. Each of these in turn was clarified as additional subsets of pursuits were identified.

- I. Non Reading Related Pursuits
  - A. Teaching-learning content
  - B. Non instructional
- II. Reading Related Pursuits
  - A. Active Reading Pursuits
    1. Pre teach reading vocabulary
    2. Pre teach reading or study skills
    3. Providing background information for reading
    4. Student reads with direct teacher instruction
    5. Student practices skills or shows evidence of active reading behaviors taught
  - B. Passive Reading Pursuits
    1. Student reads silently using teacher prepared study material



2. Student reads silently using non-teacher prepared material

#### C. Oblique Reading Pursuits

1. Student reads orally
2. Teacher reads orally
3. Skills taught in isolation
4. Review, assessment of reading

To qualify as an active reading pursuit, an activity must take place in preparation for, or during, reading. The reading must be done in content related material and direct instruction must be given by the teacher.

Passive reading pursuits are those in which students are engaged in a reading activity for which no preparation or direct instruction is given. Material may or may not relate to content.

Oblique pursuits are those which are only indirectly related to content area reading or whose relationship is obscure. These activities lack one or more of the qualifications for active reading pursuits. For example, reading skills may be taught independent of any subject matter assignments; students or teacher may read orally without attention to reading behaviors, or the interaction may take place after the student has read the material.

*Step 2.* Once the activities which would be accepted as the active, passive, or oblique reading pursuits were identified and defined, an observational scale was designed. Since the data analysis was to involve the computation of percentages of total class time spent in teaching reading, a continuous real time measurement system was used. This type of measurement occurs when every duration of behavior is recorded during an observation session. Probe sampling was considered as a coding strategy, but rejected because it is insensitive in detecting activities which occur infrequently. In teaching a reading skill, duration of that instruction may be more meaningful than frequency. Merely "mentioning" the meaning of a vocabulary item may rate a frequency count, but may do little to help students learn the word. The coding instructions were designed to make recording as simple as possible. Time was recorded at the beginning of each new activity. The categorization scheme allowed observers to be objective about the coding of pursuits; this kept observer inference at a minimum and enhanced observer agreement. Data extracted from each observation included: (1) the type of activity that was observed, (2) the frequency and duration of each, and (3) who participated in the activity.

#### Method

Subjects of the study were all eighth grade language arts and social studies classrooms in one local school district. In the four middle schools in this district, eighth grade language arts and social studies classes are combined into two-period blocks. Thirteen teachers are responsible for teaching these blocks; each teacher teaches both the social studies and language arts classes of a block. In most instances, the block is treated by teachers as two separate subjects, and no attempt is made to integrate the curriculum of the two subjects.

Six graduate students in education were recruited and trained to conduct the observations. A manual was prepared to assist observers with defining and categorizing the reading activities. Observers randomly selected the times during which the observations would be made within a given period of time.

#### Results

Major findings from the data are as follows:

1. Total observed time for the four schools was 3546.5 minutes, or 59.1 hours. Less than 0.9% of the total observed time was spent in active reading pursuits. This represented an average time of five minutes for each two-period block. Block times ranged from 80 to 100 minutes.

2. In the observed classrooms, reading made up 51% of the average eighth grade student's class time. The largest portion of this time (28.1% or 998.6 minutes) was spent in silent reading, mainly written assignments, in which students read a text and answered questions about what they had read or worked on written reports. Oblique reading behaviors made up another 17.4% of this 51% figure. These findings confirmed the observations of Durkin (1978) in whose study written assignments dominated the teaching scene.
3. Five percent of the total observed time was devoted to content area reading instruction, with the majority of this time being spent in "Student Reads, Teacher Provides Instruction." Very little time was spent in preteaching vocabulary or preteaching reading skills (0.8% or 27.3 minutes), although several teachers provided background information before the students read.
4. Non-instructional activities consumed 15% of the time, nearly three times as much of the observed time as content area reading instruction.
5. One school accounted for more than half of the reading instruction observed. In this school, 14% of the total class time was devoted to reading instruction, and all teachers spent some time in these activities. Block teachers spend time working together to plan their language arts/social studies classes, and some of this planning time is spent developing methods for helping students read the assignments.
6. Eighteen percent of the teachers were able to approximate the amount of time that they would spend in preparing students to read homework assignments. The teachers who estimated correctly predicted that they would spend no time on this activity, and, in fact, they did not. Thirty-one percent of the teachers were able to give a good estimation of the amount of time that they would spend preparing students for, or helping students with, in-class reading assignments.
7. Teachers with five years or less of teaching experience provided twice the amount of reading instruction as teachers with more than five years' experience.

#### Implications for Educational Practice

The definition of reading that places emphasis on "teaching content" rather than on "teaching skills" adds a new perspective to secondary reading programs. Teachers may now view reading, not as a separate subject, but as a tool needed to facilitate the learning of a content. It would seem that content area teachers would be uniquely qualified to provide students with motivation and purpose for reading in the field that they have chosen. Since it is assumed that content teachers can read well the material of their subject, they are also qualified to recognize the reading behaviors that indicate that a student is (or is not) handling the material efficiently. "As sophisticated learners, they know how to read selectively—how to distinguish key ideas from supportive evidence; major from minor points" (Cunningham, p. 380). Teaching reading skills in the situation in which they are used is economical, since this type of instruction utilizes the training that the teachers have already received.

This view of reading also shifts some of the duties of the reading specialist from teaching classes of remedial reading students to providing resources and information on reading to the rest of the teaching staff. As Robinson (1975) pointed out, "Certainly reading or language arts specialists are aware that reading cannot be set aside as an isolated entity; they know that the reading process(es) can only exist in relationship to content" (p. 3).

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# A QUALITATIVE ANALYSIS OF READING INSTRUCTION IN LOW LEVEL LANGUAGE ARTS AND READING CLASSES IN ONE HIGH SCHOOL

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In 1981 more college textbooks dealing with teaching reading in the secondary school appeared on the market. Revisions of earlier versions only five to seven years old have been heralded as new and exciting. A new twist here and there is noted by the addition of terms in titles like "middle school," "middle grades," and "integrated." The Great America Reading Machine is functioning predictably!

In the secondary schools some trends are observable. While ten years ago few special education, remedial or developmental reading classes were in existence and the push was for every teacher to be a teacher of reading, today content area reading fervor has subsided. Today reading specialists coexist with the special education teacher, each teaching their respective portion of the students scoring in the first three stanines on standardized reading tests. The special education teacher, given the paperwork and referral system of 94-142, has fewer students. The reading teacher is a person without a home, with one foot in the special services department and another in the English area. In a few schools the reading specialist has advanced study skills or efficient reading classes and the "low level kid" stigma is reduced. In some other situations the reading specialist has some "released" time to serve as a reading consultant to other teachers. But entry into other classrooms is often painful.

In some junior high/middle schools the reading instruction is carried by "core" teachers through the use of the basal reading series that now have been adopted up through grade eight. Schools' goals and statements of philosophy make strong statements about reading throughout the curriculum, but the rhetoric is usually empty.

Some school building reading plans have been created for central office consumption, and 20 minutes a week of SSR, Sustained Silent Reading, has salved a few souls. Requests for

inservice on secondary reading have trickled to a halt.

And what is happening in the classroom behind closed doors? What could be happening? What should be expected or demanded? Is content area reading a reality or a pipe dream?

In order to answer some of these questions Hesse and Bullock (1981) suggest "products of active reading" be taught and encouraged by content area teachers. These observable products of active reading were suggested because they would serve as proof that a student was processing the material in order to make meaning.

Wittrock's (1974) generative model of learning, which grew out of a decade of research on transfer of learning, gave rise to his Generative Model of Comprehension. This model posits that sentences are retrieval cues used to retrieve memories of earlier experiences. From these memories the reader generates or infers meaning from the text. The generated meanings represent comprehension of the meaning. In a series of studies (Marks, Doctorow, Wittrock, 1974; Wittrock, Marks, and Doctorow, 1975; Doctorow, Wittrock, and Marks, 1978) comparisons of predictions from generative models and other models were made. In the 1978 study, retention and comprehension were facilitated when students actively constructed meaning from the text. The constructed meaning was triggered when students were asked to generate summarizing sentences using high frequency vocabulary from the text that served as semantic retrieval cues. These cues facilitated recall of information relevant for the construction of meaning from the text.

Even though this experimental research on reading comprehension added future validation to the active reading behaviors advocated by Hesse and Bullock, there still was little information available on the kind and quality of pupil pursuits—reading or otherwise—in content area classrooms. Policy makers, administrators, reading specialists and content teachers still had no baseline data from which instruction decisions could be mandated or encouraged.

Slinger and Hesse (1981) developed and proposed the use of an observational scale that would allow researchers and practitioners to gather data on the kind and quantity of pupil reading pursuits in content area classrooms. Bullock, Slinger, and Hesse (1981) developed and proposed the use of an observational scale that would allow researchers and practitioners to gather data on the kind and quantity of pupil reading pursuits in content area classrooms. Bullock, Slinger, and Hesse (1981) reported on the data gathered in eighth grade language arts and social studies classrooms. While no judgements were made on the amount of time spent in active reading, passive reading, oblique reading, non-reading, and non-instructional pursuits, the percentage of time spent in active reading pursuits seemed small.

In order to better understand the earlier data and to test the usefulness of the Pupil Reading Pursuits Observational Scale, the study reported here was conducted.

## Purpose of Study

The study had three purposes. First was to determine the kind and quantity of pupil reading and non-reading pursuits in high school reading and language arts classrooms. Bullock, Slinger, and Hesse (1981) had gathered baseline data in eighth grade language arts and social studies and a comparable set of data was desired. The second purpose was to test the utility of the Pupil Reading Pursuits Observation Scale and the data it yielded. It was known the scale could be used in a social studies class, but the problems encountered in a language arts class still remained. In addition, while the scale had been designed to assess reading pursuits in a content class, we were curious as to whether or not it could be used to assess the kind and quantity of content reading instruction in a non-content class—reading.



The third purpose was to suggest modifications in the scale and to establish a more definitive scale user's guide.

### Classes to be Observed

One four-year high school of 1400 students in a suburban Oregon community was selected. Students in the high school are grouped for instruction in Language Arts and Reading by performance on standardized reading tests and performance assessment by previous language arts teachers. At the time observations were made, there were:

- 14 sections of low level language arts classes—students in stanines 4 and 5.
- 32 sections of regular language arts classes—students in stanines 6 through 8.
- 2 sections of advanced language arts classes—students in stanines 8 and above.
- 8 sections of special reading classes with students who were in stanines 2, 3, and 4.

The students in the reading classes were taught by certified reading specialists who were affiliated with the Special Services Department. They also took other language arts classes which were taught by certified language arts teachers.

Our focus within these four groups became the fourteen low level language arts classes and the eight reading classes. The fourteen sections of language arts were taught by seven different teachers. We selected five classes taught by five different teachers. Each class of fifty minutes was observed three times over a two-week period. The eight reading classes were taught by two teachers. Both teachers were observed three times in one of their reading classes.

The five language arts teachers reported their instructional plans in the classes observed were similar or identical to their own parallel sections that were not observed. The reading teachers team planned with precision and while only one of four ninth grade reading classes was observed, the activities in the other three on any given day would have been the same even though the exact allocation of minutes may have varied. Thus we assumed we had selected an adequate sample of the low level language arts and reading classes.

### Observation Scale

The observation scale, the same one used in Bullock, Slinger, and Hesse (1981) study of eighth graders, was essentially identical to the scale suggested and described in detail in Hesse and Slinger (1981). The categories used in the scale can be seen in the presentation of data in Table 1 and each category is described in Hesse and Slinger (1981) and Slinger (1981).

### Training of Observers

Two observers were used. One was one of the original designers of the scale and the other was a reading specialist from the high school in the study. The two observers studied the written description of the categories contained in Hesse and Slinger (1981) and Slinger (1981). They then met with others who had used the scale to discuss instances and non-instances of instruction that would fit each category. This was followed by use of the scale in a pilot class and a subsequent discussion and verification of data from the pilot observations.

### The Observation Schedule

The twenty-one observations of 50 minutes duration were made over a two-week period of time. Teachers observed were contacted prior to the observation period, the study was explained in general terms, and permission to observe was secured. While each teacher knew they would be observed three times during the two-week period, the actual days of observation were not known in advance.

Each period of observation began and ended on the minute and second class was scheduled to begin and end. The observation scale is designed so the observer records the time any

student or teacher activity is initiated. In addition each activity is briefly described. Within a few hours of each observation, the description of each activity was shared with the second observer who validated or challenged the categorization that was used. The challenged categorizations were resolved through discussion which had as its primary aim consistency of categorization.

### Results

Five language arts teachers were observed for three fifty-minute class periods. The total number of minutes observed was 750. Two reading teachers were observed for three classes for a total of 300 minutes.

Only six of the fifteen language arts classes—numbers 1, 2, 4, 10, 11, 12—had any activities in the reading categories and all six reading classrooms had activities distributed in the reading categories. A great majority of the language arts classrooms had more than thirty of each 50 minutes spent in non-reading content activities. While all classes had non-instructional time, the range varied from 1½ minutes to 18¼ minutes per 50-minute class period.

In Table 1 the percent of time spent in language arts and reading classrooms in each of the five major Pupil Pursuits is presented.

The data reveal considerable difference in time spent in the various categories and across classrooms. Students in language arts classrooms spent 10% of the time in active reading as compared to 50% in the reading classes. The total amount of time spent in reading, a sum of the first three categories, is 21% in language arts classes and 93% in reading classes. Also of note is the difference in non-instructional time, 22% compared with 7%.

### Discussion

When comparing the results of this study with the Bullock, Slinger, and Hesse (1981) study, two things are interesting. The language arts classes' total percent of time spent in content activity, in noninstructional reading, and in passive reading are quite similar, 77% compared to 79%. While in this study very little time, 2%, was spent in passive reading, this percent would have increased if one of the teachers had run class in his usual fashion which was to give the students the entire period to read from their library books. But, as he explained to the observer, "I decided to teach today so you could have something to observe. Usually I just let the kids read. I give them a break and me a break, too. I do this every Friday."

In the language arts classes, given the amount of time observed in noninstructional activities, the low skill level of the students, and the low percent of time spent on any reading at all, it seems students would benefit by a restructuring of class time and priorities incorporating more reading behaviors. It seems as if the teachers in these language arts classes have designed a "reading free curriculum." This does not have to be the case. The reading teachers, in contrast, have a definite content as well as reading. Their secret to success lies in the following:

First, they have effective classroom management skills. Students move purposely and quickly from one activity to another. Structure is a given. Class activity begins on the minute it is supposed to. Expectations are clear, and the students respond accordingly.

Second, they are free to choose their own content—as long as they teach reaching. Given that, they choose to teach reading not as a set of isolated skills on worksheets, but as comprehension, thinking, and study skills. They have the freedom to decide what their students need to know to survive in school and the world and then develop their own materials accordingly. They use a minimum of commercially prepared reading materials and thus they breathe their own life into the content.

Third, they talk about units of instruction—their content—



rather than the skills or processes they teach. For instance, they speak of the "hero unit" or the "newspaper unit" or the "logic unit." Conversely, language arts teachers speak in terms of skills—spelling, vocabulary, writing, punctuation. They have no vehicle to carry their skills. The reading teachers do. Consequently, they have more content reading. If they taught skills rather than units, they would have had a considerably greater amount of their time spent in the "teaching skills in isolation" category, an oblique reading category, rather than an active reading category.

Table 1

# PERCENT OF TIME BY GENERAL PUPIL PURSUITS AND CLASSROOM CLASSIFICATION

| Pupil Pursuits             | Classrooms    |         |
|----------------------------|---------------|---------|
|                            | Language Arts | Reading |
| Active Reading             | 10%           | 51%     |
| Passive Reading            | 2%            | 0%      |
| Oblique Reading            | 9%            | 43%     |
| Non-Reading Content        |               |         |
| Activity                   | 57%           | 0%      |
| Non instructional Activity | 22%           | 7%      |

Many nonreading issues surfaced and should be considered along with the data that is presented. Should curriculum be mandated for low level language arts classes and, if so, should that curriculum be a set of worksheets teaching skills in isolation? Does teaching adverbs and paragraphing have academic value for students who can barely construct a sentence? We are in the throes of a "no fault" syndrome where everybody loses. Teachers see students as dumb and unmotivated because the things being taught are inappropriate. So both teacher and student feel like a failure. Department heads and building administrators mandate a curriculum that they believe appropriate and meet with unhappy faculty and lowering test scores. Central office personnel managing curriculum from a distance respond to a competency base model mandated by the state and previous promises made to the public. Most teachers with low level classes have developed a teaching style that is appropriate for average and above average students. They use classroom management techniques that work with the mature students and do not easily shift expectations and structure for the low level class. The adjustments that are made are usually in an effort to "let up" on the students. Letting up results in teachers reading, a reliance on discussion, films, worksheets, and other strategies that are not dependent upon the students reading either in or out of class.

While this study was intended to only gather descriptive data about what was happening in reading and low level language arts classrooms and no attempt was made at measuring student gain, the teachers in this study were advised to examine the results of Stallings (1979) when she reported, "In each year of the study, we found students made more gain in classrooms where teachers spent more time instructing, discussing homework, providing considerable supportive feedback and having students read aloud in small groups. Students made less gain in classrooms where 40-50% of the time was allocated to written assignments, another 30-40% of time was allocated to silent reading and teachers graded papers or made lesson plans during class time." It seemed to these authors that an optimum amount of time in active reading and in some of the oblique pursuits would be desired. Given this awareness, it was felt the informed language arts or the reading teacher could, with appropriate collegial and administrative support, examine their own use of classroom time and adjust their teaching strategies so students would increase their likelihood of reading gain.

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## ASSESSMENT OF CONTENT TEXT DIFFICULTY BY ELEMENTARY AND MIDDLE SCHOOL PERSONNEL

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Actual observation of classroom activities indicates that most teachers depend upon a single text and ditto materials to provide printed material for their students (Durkin, 1979). In the elementary school, particularly, there is a reliance on the textbook to provide the basis for activities, questions and teaching techniques. The seeming reluctance of teachers to provide supplementary materials provided a direction for study.

In a recent survey, 56 elementary and middle school teachers were asked to list five reasons they believed more supplementary materials were not used in classrooms. The responses were tallied as to frequency of occurrence. The most frequent (n=54) response was an expected one, that of not enough time to search for and prepare material. Second (n=43) was a perceived lack of material available in the schools.

Third (n=40), teachers claimed they had difficulty judging supplementary material grade levels. If this survey is representative, then perhaps it is relevant to evaluate teachers' abilities to judge relative difficulty of textual material. In an earlier study by Palmatier and Strader (1979), secondary teachers were found to be generally unable to rank passages accurately according to reading difficulty. It was of interest to the authors whether or not this finding was true of elementary and middle school personnel as well.

One hundred seventy seven people attending a summer reading workshop at East Tennessee State University were presented the task of rank ordering five 100-word passages in each of the content areas of science, social studies, language arts and mathematics.

## METHOD

### Subjects

The sample comprised 177 people attending a 1981 summer reading workshop at East Tennessee State University. For the study, the subjects were considered as a total group and

separately by employment category, level of students taught, administrative task, number of reading/language arts classes taken, and classroom organization. The majority of those attending were classroom teachers in the elementary grades. Most of the administrators and supervisors attending were responsible for elementary and middle school levels. Eighty-seven percent of those attending had had at least three reading courses; 36 percent had taken the course Materials for Teaching Reading which contains a readability unit.

### Procedures

Five 100-word passages were selected for each of the content areas of science, social studies, language arts and mathematics. The Spache Readability Formula (Spache, 1953), the Fry Graph (Fry, 1968), and the Dale Chall Readability Formula (Dale and Chall, 1948) were used to verify difficulty levels from third grade to eighth grade. Passages were from textbooks on the State of Tennessee Adopted Texts list.

Subjects were asked to rank order each set of passages according to reading difficulty for students. Sufficient time (20 minutes) was allotted so that all finished the task and completed the accompanying questionnaire describing categories of employment, etc.

The Statistical Package for the Social Sciences (SPSS, 1973) was used for computer analysis of the data. The parametric program portion provided frequency and percentage tabulation for each group and for the total sample on each of the twenty passages. Chi Square evaluations illustrated the associations between groups and accuracy of rankings.

### Results

Several interesting results were found upon examination of the data. Generally, participants were able to rank social studies passages most accurately—percentages for five passages ranged from 38 percent to 50 percent correct. In mathematics the lowest percentage correct on a passage was 24 and the highest was 71. Science rankings ranged from 4 percent to 58 percent correct. Of particular interest, however, were the language arts rankings. Subjects were generally unable to rank those passages correctly: passage 1-7 percent, 2-7 percent, 3-7 percent, 4-35 percent, and 5-22 percent.

Chi Square values were computed in order to test the associations between the following categories and accuracy of rankings:

1. Employment category
2. Grade levels of students taught
3. Administrative tasks (if appropriate)
4. Number of reading/language arts courses taken
5. Classroom organization

Significant associations ( $p < .05$ ) were found in seven out of twenty passages between accuracy in ranking and employment category. In only one instance was there a significant association between ranking and grade level of students taught. Five out of twenty associations were significant between administrative responsibility and ability to rank correctly. Number of reading and language arts courses taken was not significant to ranking, nor was the Materials for Reading course. Classroom organization was significant in seven out of twenty cases.

Classroom teachers were better able to rank passages than were those of other employment categories in the study. Their percentages correct were consistently higher than were those of administrators, supervisors and college students. Grade level taught was generally not a determinant of ability to correctly order passages. Elementary and middle school categories were analyzed combined and separately without significant results, and percentages correct were approximately equal.

Administrative and supervisory levels were studied with respect to subjects' abilities to rank passages. For the most part, those responsible for elementary and middle schools did better by percentage than did those responsible for system-

wide or high school levels. Number of reading/language arts courses taken by subjects was not a determinant of ability to rank, although 32 of those in the study had had more than seven courses. Eighty-seven had completed three to five courses.

Type of classroom organization was significant in that those responsible for self-contained classrooms in all cases scored higher, by percentage, than did those responsible for departmentalized or special classes. Those in the study who had completed a materials for reading course did approximately as well as did those who had not had such a course.

### DISCUSSION

While it is hazardous to generalize results to the entire population of school personnel, the authors believe that those examined are representative of school personnel in the region East Tennessee State University serves. Their training, years taught, and classroom organizations closely approximate regional data. In contrast to a study by Palmatier and Strader (1979) in which high school teachers were generally unable to rank passages, elementary and middle school teachers were able to do so with moderate success. It is interesting to note, however, that they were for the most part unable to rank language arts passages, despite many having had courses which carry readability components. It may well be that instruction in readability calculation does not carry over to the sort of "holistic" eyeball determination of relative difficulty involved in the study.

On the basis of these results, a component will be added to a control group of students in language arts block of courses. Instructors will attempt to teach students how to look for various things which raise readability levels. A follow-up study is planned to determine whether or not this training increases ability to judge relative difficulty of language arts material.

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### VOCABULARY INSTRUCTION IN MATHEMATICS: DO THE "LITTLE" WORDS COUNT?

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Many researchers have noted the importance of teaching students the vocabulary and concepts needed in the various content areas including mathematics. Taschow (1969) noted that Gray and Holmes found that even small amounts of direct and planned teaching of terms and concepts produced "dramatic" results in terms of comprehension and content field knowledge. John (1947) suggested that the meaning of mathematical terms such as "tangent" and "ratio" must be taught. Investigators such as Willmon (1971) and Kane, Byrne, and Hater (1974) have studied the vocabulary needed in mathematics. The emphasis of such investigators has been technical vocabulary.



Yet, as Dunlap and McKnight (1978) noted, there are three levels of mathematical vocabulary: the general, the technical, and the symbolic. The general and symbolic have been somewhat neglected. Perhaps it is assumed that knowledge of the general vocabulary will come from everyday experiences. However, Phillips (1979) noted that the correct interpretation of "little" words (from the general vocabulary class) is a major cause of difficulty in mathematics. Sullivan (1980) identified 30 words that comprised 51% of a sample of 44,394 words from selected K-6 grade mathematics texts. Most of these words represented "little" words from the general vocabulary class such as "the", "of", "to", "is", "a", "and", "in", and "at". But, does teaching students the meanings of "little" words from the class of general vocabulary enhance mathematics performance? The purpose of this study was to find out.

### Procedures

Thirty-eight fourth, fifth, and sixth grade students attending a three week summer mathematics enrichment program served as subjects in this study. The students received mathematics instruction for two hours a day, each day of the three week period. Initially, all students were tested on mathematics computation using the *Metropolitan Achievement Test, Intermediate Level*. Based on their performance, students were assigned to one of four groups. Each group received daily instruction on mathematics computations and concepts for a period of one-half hour. Another half-hour was spent working individually on skills cards, another half-hour was spent on a fun math activity, and a fourth half-hour was spent on the control or experimental treatment. Students were assigned to the experimental or control group on the first day. Comparison of the pretest scores on the *Metropolitan* for the experimental and control groups indicated no significant difference ( $t_{(36)} = .187$ ; NS). The pretest mean of the experimental group was 5.15 and the mean of the control group was 5.12. The control group received drill on basic addition, subtraction, multiplication, and division facts while the experimental group received instruction on the meanings of 50 vocabulary words. The words and their meanings are contained in Table 1. The meanings of the vocabulary words were discussed and recorded. Occasionally a game was played to reinforce the word meanings. Two informal tests were given to check students' retention of word meanings. The four groups rotated their activities so that during any half-hour no two groups were involved in the same activities.

On the last day of the program all students were posttested on mathematics computation. Pretest-posttest scores were compared for the entire group. Posttest scores for the experimental and control groups were also compared by means of a t-test. As suggested by Gay (1981) if groups are essentially the same on the pretest, posttest scores can be directly compared using a t-test.

Table 1

### VOCABULARY WORDS AND THEIR MEANINGS

| Word | Meaning             |
|------|---------------------|
| the  | one specific thing  |
| is   | equals              |
| a    | any one thing       |
| are  | equals              |
| can  | able                |
| on   | on top of and under |
| page | one sheet in a book |

|           |                                                                                                            |
|-----------|------------------------------------------------------------------------------------------------------------|
| who       | question asking about someone                                                                              |
| find      | figure                                                                                                     |
| one       | idea in the head that stands for more than 0 and less than 2                                               |
| ones      | position; in a figure, the numeral to the far right                                                        |
| ten       | idea in the head that stands for more than 9 and less than 11                                              |
| tens      | position; in a figure, the numeral to the left of the ones                                                 |
| hundred   | idea in the head that stands for more than 99 and less than 101                                            |
| hundreds  | position; in a figure, the numeral to the left of the tens                                                 |
| and       | something more, do both                                                                                    |
| or        | either this or that but not both                                                                           |
| number    | idea in the head                                                                                           |
| numeral   | sign or symbol used to stand for a number                                                                  |
| how       | question word asking for step or steps                                                                     |
| many      | amount, contrasted to few                                                                                  |
| how many  | question asking for the number of something                                                                |
| what      | question asking for things as opposed to persons                                                           |
| you       | contrast to me, statement directed to you                                                                  |
| your      | contrast to mine, shows ownership                                                                          |
| we        | group including self, usually the subject of the sentence                                                  |
| it        | contrast to he/she, in math refers to problem or thing                                                     |
| look      | command to put eyes on and allow brain to react                                                            |
| write     | put pencil in hand and make mark, symbol, etc. not write in cursive                                        |
| each      | every single one                                                                                           |
| numbers   | ideas in the head                                                                                          |
| this      | specific one in close location                                                                             |
| that      | contrast to this, specific but not in close location                                                       |
| set       | group of things with something in common                                                                   |
| us        | group including self, usually the object of the sentence                                                   |
| there     | contrast to here, not in close location                                                                    |
| which     | question that implies a choice                                                                             |
| do        | work or figure                                                                                             |
| same      | alike, not different; equal in meaning                                                                     |
| exercises | problems, not physical activities                                                                          |
| these     | contrast to those, more than one in close location                                                         |
| first     | contrast to then, usually means spatial e.g. first in line; in math has to do with time e.g. do this first |
| have      | contrast to have not or had, hold in one's possession                                                      |
| here      | contrast to there, here is in close location                                                               |
| times     | multiply; in "How many times" may mean the number of trials or performances                                |
| has       | possession of, singular form                                                                               |
| all       | everything or everyone                                                                                     |
| equals    | is, are, or the same amount on both sides                                                                  |



### Results and Discussion

Comparison of pretest and posttest scores indicated that the students as a whole made significant gains ( $t_{(37)} = 5.72$ ;  $p < .001$ ). The mean of the posttest was 6.6 months higher ( $\bar{X} = 5.81$ ) than the mean of the pretest ( $\bar{X} = 5.15$ ). When posttest scores for the experimental and control groups were compared no significant difference was found ( $t_{(36)} = .87$ ; NS). However, the mean ( $\bar{X} = 5.98$ ) of the experimental group was 3.6 months higher than the mean ( $\bar{X} = 5.62$ ) of the control group. Although not significant, a difference of 3.6 months in three weeks time seems promising. Perhaps with additional time to ensure that the meanings of the words had been mastered, gains would have been significant. This possibility is being explored in a follow-up study.

It is interesting to note that drill on basic addition, subtraction, multiplication, and division facts which many teachers believe is necessary was no more effective than vocabulary instruction in improving mathematics computation.

When the reading specialist is asked by the mathematics teachers what can be done to help students read mathematics the discussion almost always turns to word problems and ways of helping students comprehend word problems. The results of this study would seem to indicate that helping mathematics teachers teach their students the meanings of the "little" general vocabulary words used in mathematics textbooks and suggested in the teacher's manuals for use in presenting lessons certainly would not be detrimental to mathematics achievement. Direct instruction supplemented by discussions and games could be used.

As noted, this study is being replicated over a longer period of time to allow sufficient time to insure mastery of the words. Preliminary results indicate the experimental group has made significant gains over the control group.

Although further study is needed on a variety of populations, it appears that reading specialists may assist math teachers with more than word problems. Teaching the students the meanings of the general vocabulary used in mathematics is at least as effective as drill on basic facts and may yet be shown to be more effective.

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### REACTION: VOCABULARY INSTRUCTION IN MATHEMATICS

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Some of the research of the past has suggested that a direct study of mathematics vocabulary alone can produce significant gain scores on mathematics tests. What perhaps is surprising to mathematics teachers about the Sullivan paper is that the identified vocabulary comprising more than one-half of the vocabulary used in mathematics texts from K-6 represented "little" words. What is even more surprising is that almost three-fifths of the words were not mathematical terms. Perhaps many mathematics teachers would have assumed that the proper place to begin vocabulary instruction would be with mathematics terminology. They might also have failed to realize that just because a child can pronounce a "little" word that does not necessarily mean that he knows the meaning of the word, especially in a mathematical context.

Even though no statistical significant differences were found between the control and experimental groups, the overall direction of the research seems promising. Perhaps as Sullivan suggests, more than a three week time period is needed (students were only given thirty minutes each day of the three weeks) to ensure that the students had mastered the meanings of the words.

The Sullivan study apparently was also limited in that the research was done during a three week summer mathematics enrichment program. Evidently all students in the study had to have two hours of mathematics instruction each day; therefore, having a typical "control" group was impossible. Both the experimental and control group of the study received three-fourths common treatment, and possibly this is what caused the 6.6 months gain on the *Metropolitan*. It is possible that neither the teaching of the meanings of the vocabulary words for the experimental group nor the drill on basic facts for the control group contributed to the gains on the test. What is needed then is a third group, one that gets the same three-fourths treatment that the two groups got in the study, but does not receive either the teaching of the vocabulary or the drill on the basic facts. It may be that scores for the group that receives vocabulary instruction and the group that receives drill on basic facts would not be significantly different, but both methods might be superior to scores that the third group would have. This information could be extremely useful to teachers. If this finding were the case, then one could legitimately conclude that instruction on vocabulary would be as effective as basic drill and that either process could improve mathematics scores. On the other hand, if there were no significant differences in the scores of the three groups, then neither teaching the vocabulary nor doing the drill would be recommended.

In spite of these criticisms, the research by Sullivan is encouraging. Results from her longer study now in progress should have even more valuable information for the mathematics and reading teacher.

### FACTORS AFFECTING COMPREHENSION OF MATH WORD PROBLEMS—A REVIEW OF THE RESEARCH

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The research that focuses on students' comprehension of math word problems can be viewed from the math educator's perspective, the reading educator's perspective, or from a

pedagogical perspective (Cohen, 1981).

The math educator's perspective suggests that to improve a student's comprehension of math word problems, the instructor must concentrate on the teaching of math concepts, procedures, generalizations, logical exchanges, and number facts. In order to read and work math problems successfully, one must understand the logical exchanges or moves (Davis, 1978) involved in solving the quantitative problems.

The reading educator's perspective would relate difficulty with word problems in math to linguistic and psycholinguistic comprehension theories. One such theory is Carver's (1977-78) reading model which uses two variables that deal with written discourse and two that represent reader characteristics to predict comprehension performance. Pearson and Johnson (1978) would criticize Carver's model as too simple and would use more elaborate theories of comprehension to describe comprehension of word problems in math. "Whether the theory approaches the parsimony of Carver's or the complexity of Pearson's, these reading educators perceive comprehension as an interaction of text characteristics with reader characteristics" (Cohen, 1981, p. 177). The math educator's perspective puts most of the emphasis on the characteristics of the learner. This perspective tends to concentrate on strategies of instruction and the nature of problem solving, rather than focusing on written discourse and the subject's reading aptitude.

The pedagogical perspective would view the understanding of word problems in math in terms of a behavioristic approach such as that offered by Skinner (1969). This perspective would focus on the possibility of directly modifying behavior of math students rather than testing theories. This approach would begin with data in search of a theory. Both the math and reading educator's perspectives begin with a theory in search of data.

The author will attempt a review of the literature for factors affecting the reading of mathematics. This review will emanate from these three perspectives.

### **The Math Educator's Perspective**

The perspective of the math educators places emphasis on the math aptitude of the learners. This view would suggest that students must possess certain understandings to succeed in mathematics. Piaget (1953) postulated that one such prerequisite for young subjects was conservation. He contended that a student does not acquire mathematical relationships through verbalizations, but only when his mental maturity is sufficient to grasp the principle of conservation of quantity. The student can then see that the number of items in a group remains the same regardless of how they are arranged. "Any adult attempt to impose mathematical concepts on a child prematurely results in verbal learning only" (Corle, 1972, p. 76).

Piaget also introduced the concept called reversibility. This prerequisite necessitates an understanding of the fact that regardless of how the quantity is manipulated, it can be restored to its original state by an inverse action (e.g.,  $7 - 4 = 3$ ,  $3 + 4 = 7$ ). According to Piaget, if a student lacks the capability to perceive such relationships, he cannot succeed in mathematics.

Brace and Nelson (1966) found a positive correlation between five- and six-year-old children's knowledge of cardinal number and their conservation abilities. This relationship decreased with age. Murray (1965) stated that the transition from non-conservation to conservation occurs sometime between the ages of seven and eight. "Any training procedures prior to this transition age appeared only to result in memorization of statements about the abstractions rather than to provide an awareness of the meanings of the relationships themselves" (Corle, 1972, p. 77). Almy (1966) investigated five- to eight-year-olds to determine the age at which students attained reversibility. Almy's study showed that the age of reversibility for most of the middle-class subjects was seven years and four months. Her study supported Piaget concerning the maturational

development of a student's logical abilities.

So, once again the age-old question appears concerning the link between maturation and environment. Most researchers, however, are cognizant of the folly inherent in a determination to account for all the variance in math achievement by such simplicity. Intellectual development while certainly related to achievement in about anything, has always accounted for only a portion of the variance when the criterion was reading achievement, math achievement, or delivery of a paper at the American Reading Forum.

Hoel (1954) concluded from a study of math underachievers that emotional difficulty was responsible for most of the failure. Capps (1962) concluded from a study of accelerated and retarded students in math that underachievement in math was related to personal adjustment. Examination of the mean intelligence quotient for retarded math groups indicated that these fourth and six grade subjects had average mental ability. Bruekner and Grossnickle (1953) specified the inter-correlations between intelligence and various math skills, with a low of .35 between I.Q. and math computation skills.

But what about the correlation between math computation skills and higher problem-solving ability? The math educator's perspective suggests that the correlation between math computation skills and the reading of math word problems should be positive and high. Balow (1964) studied 1400 sixth-grade subjects to determine the importance of reading ability and computational ability in solving math word problems. Balow discovered that general reading ability and computation ability had a significant effect on problem-solving ability. Scores on the math word problem test showed a closer relationship to computation ability than to reading ability.

Stern and Keislar (1967) investigated the utility of offering instruction in problem-solving strategy to third graders. Their study demonstrated that children who were taught strategies for solving math word problems were significantly more successful than children who had not been given such instruction. Cathcart and Liedtke (1969) studied the importance of selecting the proper solution process for a math word problem. Their findings indicated that reflective students who reflected upon the quality of their answers achieved better scores than the impulsive subjects who gave unconsidered responses.

The math educator's perspective with a focus on the learner and strategies for math instruction does have support in the research literature. Maturation and intelligence are related to math learning. The writer wishes to offer a syllogism. Organisms tend to learn what they are taught. Organisms that are taught strategies for accomplishing something are much more successful in applying those strategies than organisms that are not taught. Subjects are organisms. Subjects that are taught strategies for solving math word problems are more successful in applying these strategies than subjects who are not taught.

### **The Reading Educator's Perspective**

It seems less than sagacious to suggest that numerical understanding alone will not guarantee success in mathematics, especially in math word problems.

Vanderline (1964) and Lyda and Duncan (1967) collected data which demonstrated that the direct study of math vocabulary alone produced a significant growth in elementary students' problem-solving abilities. Chase (1961) concluded that the ability to note details in math word problems was a skill necessary for success.

The textbook in many school systems is the only resource provided for instruction. Reys and Knowles (1968) surveyed elementary schools and found that two-thirds of the schools used only one textbook for math instruction. This dependence upon textbooks underscores the significance of the reading educator's perspective.

Repp (1960) counted 3,329 words taken from five third-



grade texts and found that approximately 1500 to 2000 were new to third graders. Reed (1965) found no significant agreement between the mathematics vocabulary of the textbook and the reading series used by her students. She found no significant agreement between the mathematics vocabulary of the textbook and standard word lists.

"There is considerable evidence that vocabulary specialists have discovered a disproportionate number of unfamiliar words in the mathematics books used by young children" (Corle, 1972, p. 86). Heddens and Smith (1964) used the Spache readability formula for grades one thru three, and the Dale-Chall formula for grades four thru six, to study five commercial math texts. These researchers concluded that all five series showed readability levels above the assigned grade level.

Faison (1951) studied 38 texts from grades five thru eight and compared both the level of difficulty and the interest potential of the texts. He concluded that the math books were the hardest to read and ranked next to the lowest in interest. Faison's study was recently supported by an interesting piece of research by Elliott and Wiles (1980). They investigated the difficulty of current math textbooks by administering a cloze test from an eighth grade mathematics book to 91 certified mathematics teachers. Approximately 27% of the 91 teachers received scores of 55% or less correct.

Some studies have been conducted which dealt with both mathematical capabilities and reading skills. Chase (1960) studied 15 variables that might affect an intermediate subject's ability to solve math word problems and concluded that the ability to compute, skill in noting details in reading, and a knowledge of arithmetic concepts were the best three predictors of problem-solving efficiency. Glennan and Callahan (1968) concluded that the most important factors were: general reading skills such as vocabulary knowledge, comprehension of the problem statement, and selection of relevant details; mechanical computation with a mathematical understanding of the concept of quantity, the number system, and arithmetic relationships; and a spatial factor involving the ability to visualize objects and symbols in more than one dimension.

While the math educators' perspective has support in the research literature, certain reading skills are also important for success in solving math word problems. Vocabulary development and literal interpretation of the problem seem crucial. Textbook readability is a major factor in relation to these skills.

### The Pedagogical Perspective

The experiments in this section derive from the pedagogical perspective and recognizes the Skinnerian argument that theory building should start from data collected as a result of modifying human behavior.

An initial study that began the task of isolating format variables which interfere in math word problems was conducted by Loftus and Suppes (1972). They identified and defined eight such variables. Included was the order in which the math word problem was stated as compared to the order necessary to perform the appropriate computation. These researchers also listed the number of words in the problem as an important variable. Searle, Lorton, and Suppes (1974) used a step down regression model and identified how much each of 23 format variables contributed to the difficulty of math word problems.

Cohen (1981) continued with this research. He had students rewrite typical math textbook word problems to make them more understandable for other students having trouble with math. The purpose of the Cohen study was to discover the variables students perceived as difficult, and to compare these with the variables Searle et al. (1974) identified with the step down regression model.

Cohen chose 35 gifted sixth- and eighth-grade students with an I.Q. of 132 and above to rewrite 15 math word problems.

One-half of the subjects had scored only average in math achievement as measured by grade level CTBS scores. The subjects rewrote 15 math word problems within a single class period in an attempt to make the problems easier to understand.

Cohen's content analysis of the students' rewritten items found 12 different format changes. He chose three of the variables in the format changes that concurred with variables reported by Searle et al. (1974) for further study as to their potency in solving word problems. Cohen chose variables that were amenable to student manipulation and for which it would be simple to construct instructional materials. The variables identified as interfering with math word problems were the absence of a diagram, the presence of extraneous information, and incorrect order of numbers in a word problem so that the presentation of the numbers appeared in an order other than that required for the appropriate solution.

Cohen then presented 225 average sixth graders with a 15 item test which included easy and difficult items in relation to the variables. The presence of diagrams in the math word problems, the reordering of the sequence in which numbers were presented in the problems to conform to the order required for appropriate solution, and the elimination of extraneous information all led to a significant increase in student performance in solving math word problems. The students were able to execute the arithmetic and logic of the word problems when presented in the easier formats, but encountered significant difficulty when attempting the more difficult formats. Computation was not a problem for these students. Format, however, affected comprehension.

Cohen conducted a third experiment (1981) to determine if subjects could be trained to insert a diagram when there was none, to extract extraneous information, and to reorder number sequence when it was inappropriate. The purpose of the third experiment by Cohen was to estimate how large the direct instruction effect would be after three class hours of instruction.

Seventy-one average sixth-grade students were placed in three treatment groups which received instruction in one treatment. The treatment groups used programmed materials which explained the task, demonstrated it, and then provided practice with immediate feedback. Each subject took a 21-item post test.

The findings demonstrated that when students were taught to insert diagrams in word problems that lend themselves to diagrams, they were significantly more successful than the control group. The instructional effect accounted for over 60% of the total variance. Instruction in extracting extraneous information accounted for over 65% of the total variance. Instruction in ordering numerical information accounted for 37% of the total variance.

Cohen's research is supported by Burns and Yonally (1964) who, using fourth and fifth graders, tried different ways of ordering the numerical information in math word problems. They found that subjects were less successful in getting correct answers when the numerical information was not in the order needed.

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## REACTION: FACTORS AFFECTING COMPREHENSION OF MATH WORD PROBLEMS

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One of the areas that has caused much debate and discussion among mathematics educators is problem solving. In *An Agenda for Action*, the National Council of Teachers of Mathematics (1980) stated, "Problem solving must be the focus of school mathematics in the 1980s." Mathematics teachers who have had success in teaching many topics often are concerned that their students fail so miserably in problem solving. Often these teachers are at a loss as to what to do to increase problem solving skills of their students.

Cloer's preview of the research contains a wealth of information that should be of use to both mathematics teachers and reading educators. Reading the review, one realizes that there are many factors that possibly affect or relate to problem solving. One of the predictors of problem solving efficiency was that of selection of relevant details or extracting extraneous information. Often a student will simply look for the numbers and use all that appear. If a problem begins with "In 1982 . . .", some students will use those numbers in arriving at an answer. However, a recent study by Glynn (1981), indicated that word problems in today's mathematics books contain no extraneous data. Results of the study suggested that some entire mathematics books contain not one problem with extraneous data. So when students run across such information, they simply do not know what to do with it because they have not had the training. Teaching students how to pick out the important information and how to disregard extraneous information should then be of benefit to most students in real life mathematics problems. Also, teacher-made problems on tests may contain extraneous information.

Another factor mentioned by Cloer was that of dealing with unrealistic answers. One study suggested that the student who reflected on the quality of his answers got better scores than the student who did not. While many teachers argue that students should be taught estimating or arriving at logical answers, the student who has a reading problem will have a difficult time arriving at a realistic answer.

Much discussion involved the readability level of the textbook. Again if so many of the books are written above the grade level of the students, it is no wonder that they have trouble solving problems. While research has been cited about the readability level of textbooks, apparently little or no work has been done on the readability level of the problems the teachers give on tests.

If the three perspectives discussed by Cloer are related, it seems that reading comprehension is a common theme. If a child cannot read a problem, how can he be taught to extract extraneous information, arrive at logical answers, note details, reorder information, devise diagrams and do other things mentioned in the Cloer study? Without the reading skills, the student may just pick the numbers out of the problem and do some arithmetic operation with them.

It appears that the next needed work along the lines that Cloer has pursued is a meta-analytic study. Glass (1976) has defined a meta analysis as "the analysis of analyses" (p. 3). In other words, what is needed is a statistical analysis of all of the studies taken together to determine just what the best predictors of problem solving efficiency are. With problem solving receiving so much emphasis, a definite need exists for further research on the topic.

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**TEACHING MULTI-AGE LEVEL ELEMENTARY  
SCHOOL STUDENTS COMPREHENSION SKILLS  
THROUGH A SELF-DIRECTED SOCIAL STUDIES  
LEARNING PACKET**

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The ability to comprehend is essential to student success in all curricular areas. Reading instruction is too important to be confined to one segment of the school day. Educators are realizing that while reading classes are vital for skill development, specific reading skills may not be transferring to other subject areas. Witty (1962) believes the teacher of every subject has a responsibility for helping the child to read the varied materials employed in instruction, for developing special vocabulary, building concepts, for cultivating critical reading and for fostering reading from varied sources. The use of reading skills is essential in the attainment of knowledge in the area of the social sciences. An analyses of the literature on the transfer of training reveals that transfer cannot be relied upon to achieve reading competence in content area subjects (Carney, 1977). Many teachers may recognize the value of content area reading instruction or be aware of its value, but teachers may not know how to incorporate it into their own classrooms. Some teachers have expressed concern about the frustration which students of lower reading ability exhibit when they cannot cope with the tasks of active learning. Perhaps some of this fear is that action-oriented practices make management and control more difficult. Grading students is often another problem inherent in an action-type program.

Reading is an activity that is distinguished by the content and purpose for what is being read. A concern is whether basic reading materials stimulate the type of reading that is required in the academic content areas. Studies by Stauffer (1966) and Willmon (1975) suggest that typical basal material provide a child with less than half the words necessary to comprehend the technical concepts in content materials. The writing patterns, the variance in vocabulary load and organizational structure, and the conceptual load differs greatly between reading materials and content materials. Johnson (1977) found that education in readability level appeared to have no impact on the conceptual difficulty.

Riley (1980) states that two important goals of teaching reading in the content areas are the acquisition of content area concepts and of the learner acquiring strategies which lead to the understanding of the concepts. The strategies utilized by the student will in most cases depend upon the techniques presented to the learner by the teacher.

Utilizing the process of curriculum development has ramification for the content area teacher. First, it is very important to diagnose where the students are in relation to the material: Do they know some of the concepts? Can they comprehend the vocabulary in the selections? Are they equipped with the necessary reading skills required in the level of materials which will be used?

The literature reflects, "For too long we teachers have

labored under the naive assumption that if we assign ten pages for the next day, the student will know exactly what to do with them" (Duke and Powers, 1973). It is essential to remember that we are there to guide the students in their learning in the content area. The crucial factor is how we guide the student through the material in the required subject, allowing "personal strengths, preferences, and discoveries to emerge" (Herber, 1970).

The keys to learning and retention in the content areas appear to be: an interest in learning on the part of the student; a schema into which new information may be assimilated; active involvement by the student in the search for meaning; a synthesis and reorganization of what is learned; and an application of what was learned.

The purpose of this paper is to present an alternate instructional technique to teaching comprehension skills to multi-age level children through self-directed social studies learning packets. The types of questions and activities required of the students contain statements at three levels of comprehension—literal, interpretative, and applied. Although a well-planned guide cannot solve all the problems of one class, it can provide many benefits for the students and teacher. The students in this sample are 9-11 years old and attend the University Laboratory School at Indiana University of Pennsylvania. Because the students in this school participate in many extra-curricular activities they are prevented from being consistently available for large group social studies instruction. Through a self-pacing module approach, students are provided an opportunity to gain practical experience through an integrated reading and study skills approach to social studies. The utilization of packets was conceived as a way to be of most benefit to the students and the teacher.

Tutolo (1977) believes one of the major values of a study guide is that it increases reading time, which enhances comprehension. It also provides the student with a structured approach to the material. McClain (1981) suggests that a study guide is a more flexible structure to assist the student in more efficient reading. A step-by-step procedure is given for studying the material to be learned. The idea of a study guide in this paper has been expanded into complete learning packets on the East, the South, and the Northwest and allows a flexible structure to assist the student in more efficient use of his learning and reading. In this type of approach the teacher works as a monitor, facilitator, and evaluator. The teacher must be well-organized, flexible, and possess good management skills.

The learning packets consist of questions and activities incorporating multi-media aids such as filmstrips, records, transparencies, library books, and social studies textbooks. The students are permitted to work alone or in a small group. If a student is a poor reader, he often elects to become part of a group in which there are good readers. The student is required periodically to meet individually or in small groups with the teacher to check his progress and for evaluation purposes. This innovative approach at the elementary school level is a means of developing independent research, organizational, and reading comprehension skills. (In addition to the use of packets, the students complete a map and globe skills unit and view related films in a large group followed by discussion.)

The approach described in this paper was used with 17 students in grade five and with 15 students in grade four during 1980-81 school year. The students were tested at the end of the year (1980-81) on the Comprehensive Tests of Basic Skills (CTBS).

Because of the small number of students in the laboratory school, one-third of those students in the 9-11 years age group (grades 4 and 5) were participants in the program using packets. The students were ranked using grade equivalent scores on the total reading and the social studies scores on the CTBS.

The results indicated that the majority of the students with a



high grade equivalent score in social studies were also the same students with a high grade equivalent in the total reading score. The results revealed a similar pattern for students in grades four and five. In essence those students who did well in reading comprehension were the same students who did well in social studies.

In conclusion, the use of a self-directed learning packet as a method for helping students become independent in their studying and application of skills and as a teaching technique to meet a scheduling situation proved to have value as an instructional technique. One value of the packet approach is that it teaches students how to learn. It sets a purpose for reading, allows students to relate to the material, and helps them to evaluate information. As with any new method, the students using this approach must fully understand the responsibilities placed upon them for their own learning. It cannot be concluded, however, that this approach alone contributed to the child's increase in comprehension ability. Further research using more sophisticated measures for evaluation and control needs to be conducted before the correlation between the packets approach and an increase in comprehension can be concluded.

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#### REACTION: TEACHING MULTI-AGE ELEMENTARY SCHOOL STUDENTS COMPREHENSION SKILLS

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It has been stated in beginning reading methods courses and in the literature that reading is taught in all areas of the curriculum. Teachers have the responsibility to insure that the necessary reading skills; word recognition (unique vocabulary) and comprehension skills are presented in each curricular area. Joan Elliott has concluded that high achievers in reading comprehension are high achievers in social studies regardless of the approach used to teach the subject. For Elliott, this is justification to use independent learning packets in social studies. She found that reading comprehension and social studies gains remain high or low depending upon the individual student's ability.

Principals and teachers have said many times that high

reading achievers will be high achievers in most curricular areas with the possible exception of mathematics. Why is this? Is it perhaps because we teach health, science, English, and social studies as though they were basal reading lessons?

The area of American education which is the most highly criticized by our neighbors overseas is our over-reliance on textbooks. We have reached the point where publishing houses determine the content of the curriculum and teachers follow guides and manuals, dispensing information, like robots on an assembly line. Social studies, science, and health are areas of the curriculum where teachers can generate student enthusiasm, excitement, and even love of learning, if only they would stop treating these areas as though they were reading lessons. Teach social studies in such a fashion that children are being trained in the skills of the social scientist and they will come to realize the relevance of reading as it applies to the content area.

Elliott has taken a group of 15 fourth-grade and 17 fifth-grade children and presented social studies through an independent study and small group learning mode. Capitalizing upon the idea of developing a study guide to direct independent study activities, Elliott expands the concept by developing learning packets consisting "... of questions and activities incorporating multi-media aids such as filmstrips, records, transparencies, library books, and social studies textbooks." This idea is what Veatch (1959), (1969) and Barbe (1961) called for during the '60s when writing about individualized reading instruction. Elliott concluded that the 32 fourth- and fifth-grade children maintained a consistent high or low relationship between reading and social studies achievement scores on the Comprehensive Tests of Basic Skills (CTBS). She cautions that further research is needed before generalizing that the results will be consistent time after time.

In times of competency based testing and competency based promotion standards it is refreshing to read that someone is attempting to teach children through creative, highly stimulating activities.

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#### GLOSSING FOR IMPROVED COMPREHENSION: PROGRESS AND PROSPECT

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As Otto reported at last year's (1980) meeting of the American Reading Forum, a growing number of people have been working with a technique that involves the systematic use of marginal notes and other extra-text notations to direct readers' attention while they read. The terms "gloss" and "glossing" are being used to designate and describe the technique. As we have said many times, neither the idea nor the term "gloss" is new. Both have been around at least since medieval times, when theologians used gloss to elucidate scriptures. We are attempting to refine the technique by moving toward "systematic" glossing procedures that can be used with confidence, both formally in preparing instructional materials, and informally, in face-to-face teaching in the classroom.

Instead of relying on traditional adjunct aids like questions



and advance organizers, we want to be able to direct readers' active attention to places in text where the application of specific skills or strategies would be appropriate, to instances where a particular strategy could be useful for extracting meaning, and to key words and ideas. In other words, we are trying to share mature readers' perceptions of and insights into the reading process with developing readers.

In two papers presented at last year's meeting, Otto described gloss as a two-faceted process that seeks to enhance a reader's ability to deal with both process and content related matters in seeking to understand printed material. He also pointed out the need to choose specific skills and strategies for development through glossing. In another presentation in the present session, Richgels and Hansen offer guidelines for designing gloss notations and examples of gloss notations for a wide variety of content area text selections.

While the existing papers suggest answers to many questions related to the development of gloss notations, many questions remain. Some of these questions address basic issues related to the day-to-day use of the glossing technique in classrooms. In the remainder of this paper we pose what we believe are some critical questions and suggest some tentative answers.

**Question #1: Are certain types of reading material more suited for gloss notation than others?**

**Content Area Reading Material**

Most of our thinking and effort so far has been directed toward developing gloss for content area text. However, certain realities related to content area reading present problems as well as opportunities for the teacher attempting to use gloss notation. For example, the reading abilities of students in any given content classroom will always vary a great deal. Some students will have extensive reading ability while others may lack even basic reading skills. Likewise, the background knowledge and experiences of students will vary considerably. These and other individual differences in students are factors which content area teachers must cope with daily; but these differences come into focus and demand explicit attention when one prepares gloss notations.

While facts such as these set hurdles for teachers who attempt to use gloss, they also serve to underscore the prospects that gloss offers to teachers. Gloss notation may serve as an aid to direct students to areas of text and to levels of understanding that make optimal use of their current—and sometimes limited—reading ability. By directing individual student's attention through gloss notations in text we think that there is prospect of enhancing the understanding and reading ability of the less able student and, at the same time, of challenging the more capable one.

**Developmental Reading Materials**

In addition to content area text, the material used in a reading class may offer prospects for gloss activities. One purpose for using gloss is to encourage development and application of specific comprehension skills and the "general strategies" that efficient readers use in understanding text. With this purpose in mind, it seems appropriate to use reading materials which are designed to teach reading skills and strategies. Using reading materials in which content knowledge acquisition is relatively less important may allow the teacher preparing gloss to concentrate more on process and not feel that subject matter content is being neglected.

It seems safe to hypothesize that students who are just acquiring reading skills and strategies could benefit from gloss notations which give insight into the appropriate application of the skills and strategies in the reading material they encounter. For example, the brief summaries of stories, purpose setting questions, directions regarding specific use of comprehension

skills in the text, and other similar information normally contained in basal teacher manuals could be rewritten at an appropriate reading level and placed in student books to enhance not only their understanding of the reading skills and strategies that they have been taught but also the content of the material.

Reading skills and strategies that are carefully taught and reinforced with gloss activities in a reading class will not however, automatically transfer to content area texts. As students move into the upper grades, they are faced with materials that have a more distinctive expository writing style, content specific vocabulary, and a host of new concepts. However, the introduction to gloss activities along with the introduction of reading comprehension skills and strategies in the reading class has prospects of shortening the tremendous step that now exists between "learning to read" and "reading to learn."

**Material Supplemental to Basic Text**

Gloss notations could also be used effectively with the supplemental materials which students are expected to read.

In a content classroom, supplemental materials could be glossed to demonstrate and guide students in the development and application of appropriate reading skills and strategies to be used in reading the text for the class. A teacher might develop lessons using gloss notations on transparencies, handouts and other supplemental reading materials to be used with the class. Students could receive instruction, through the use of the glossed supplemental material, on appropriate ways to read their subject area text.

In a reading class where gloss notations are provided for narrative style reading material, the problems associated with transferring reading skills might be lessened if expository style supplemental material were also provided. Elementary level weekly newspapers could serve as supplemental reading material to be used with gloss notations. Teachers could also prepare supplemental reading material written in expository style, like content material, yet at a reading level adapted to their students' ability.

In summary, the question of what type of text is best suited for gloss activities appears to be a matter of individual choice. Each of the above types of reading materials pose certain limitations and present certain problems for the teacher who prepares gloss. However, each of the above reading materials used with gloss notations appear to offer prospects for helping students to better comprehend what they are asked to read.

**Question #2: At what point in reading instruction should gloss activities be introduced?**

The answer to question one will go a long way toward providing insight for answering this question. We will briefly discuss three possible times to introduce gloss activities to students. We believe that gloss has prospects for enhancing children's understanding of text at any of these times.

An introduction to gloss activities could accompany the instruction of beginning reading comprehension skills and strategies. An examination of basal reading programs will reveal that comprehension skill instruction begins early in the first grade. Appropriate types of gloss notations could serve as a means to help young readers better understand the value of certain reading comprehension skills and strategies. Gloss used at this stage in children's reading development would have objectives more directly related to process than content. The use of gloss activities in the initial stages of reading instruction would be subject to an important condition: That the skills and strategies that are introduced have practical value for beginning readers and that this value be clearly demonstrated. We think that gloss can serve as an effective means to demonstrate the importance of reading skills and strategies to the beginning reader.

Another time to introduce gloss is when students are required to make the transition from learning reading skills in a reading class, to applying them to content-area materials. We feel certain that gloss has great promise for helping students both develop and apply effective reading behaviors in understanding expository text.

Finally, the teacher might introduce gloss to the students who display comprehension difficulties in reading. Such a use of gloss as a remedial strategy might occur when students are using either content-area material or developmental reading material. Gloss used at this time, and in this manner, would be designed to help individual students make the transition from acquiring reading skills to applying them when they read.

**Question #3: What is the optimal amount of gloss notation for enhancing the understanding of the text?**

It has been suggested that gloss notations be prepared for two purposes: (1) to enhance readers' understanding of the specific content at hand, and (2) to shape the development and encourage the application of readers' skills and strategies related to the process of reading. How much gloss is needed to accomplish this? The answer to this question may only be found through carefully planned research studies. The question goes beyond the concern that attention must be given to the amount of time available to read gloss notation and perform accompanying activities. The question relates to the common sense notion that at some point the amount of gloss notation in a text will become an important factor in whether students understand what they are asked to read. Too much gloss may interfere with students understanding, while too little gloss is likely to have no effect at all on their understanding.

It remains to be determined whether the answer to this question will be derived from subjective judgments on the part of teachers using gloss, or from well defined guidelines developed by careful research.

**Question #4: Should the stages of gloss (demonstration, development, internalization and fading) have both vertical and horizontal aspects?**

Otto and associates have envisioned four stages for gloss notations: (1) *demonstration*, where the intent is to create readers' awareness of approaches to text that help them comprehend and develop their enthusiasm for working with glossed materials; (2) *development*, where readers are given explanations of how to use skills and strategies, and opportunities to apply them in reading content-area texts; (3) *internalization*, where readers move toward a level of metacognition, including awareness of (a) when to apply the skills and strategies they have learned, and (b) which of them is most appropriate in a given situation; and (4) *fading* where readers are simply reminded to think about their own efforts to understand what they are reading, to think about the skills and strategies that help them to comprehend, and to correct miscues and misconceptions. Exactly how students will or should progress through these stages has not been determined. To the present, however, we have been inclined to think of the strategies as "process related": Students move systematically from one stage to the next as they become more familiar with the skills and strategies of the reading process.

However, it may be that the stages would better be thought of as "materials related". Students would progress through each stage acquiring skills and strategies in material of a certain type and difficulty. They would then, to a certain extent, need to repeat the stages as they encounter new text material at a higher difficulty level.

In other words, the stages may be primarily reader/text dependent. The stages may depend upon students' abilities and experiences relevant to understanding a certain text. Thus,

a student might be at the *development* stage with one type of text which requires certain skills and strategies and at the *internalization* stage with other text materials requiring different skills and strategies.

**Question #5: What should be the goal of gloss notation?**

The primary goal of glossing is to help students not only to *acquire* but also to *internalize* and *apply* the skills and strategies that enable them to be independent readers of the full range of material they encounter. To subscribe fully to this goal one must envision a reader who reads, with complete comprehension, everything possible. However, comprehension is an on-going, never ending process, which is pervasive to all reading and to verbal discourse. There can be no precise starting or stopping point from which to judge a reader's "complete" understanding.

Perhaps the ultimate goal of glossing should include an additional aspect: To develop readers who are aware of the factors which contribute to, or interfere with, their understanding of the full range of material they encounter. Such a dual goal would identify glossing both (a) as a way to strengthen students' reading comprehension skills and strategies, and also (b) as a means to provide students with metacognitive knowledge and insights assumed to underlie the ability to control one's own mental activities.

**GUIDELINES FOR WRITING GLOSS NOTATIONS  
WITH A FOCUS ON COMPREHENSION SKILLS  
AND STRATEGIES**

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Otto (1980) described a technique for improving the understanding of expository text, which he termed "gloss". Gloss employs marginal notations to direct readers' attention to places in text where the application of specific behaviors would be appropriate. The development of gloss has been motivated by a confidence that comprehension skills can be taught and a concern that students need help making the transition from *learning* skills to *applying* them when they read content-area materials.

Gloss notations are written on pages separate from the text and keyed to the text by numbered brackets. These brackets appear on the left edge of the gloss page and—when the gloss page is placed to the right of the text page—they set off sections of text to which the gloss notations refer (see Figure 1).

Figure 2 depicts gloss as the product of a dual-focused process that operates within certain constraints and considerations and provides possible instructional excursions. The figure is explained in detail elsewhere (Otto, White, Camperell, 1980). Very briefly we are suggesting that (a) the behaviors to be directed by gloss notations may include strategies as well as skills; (b) the gloss may focus on the *content* of the text as well as comprehension *processes*; (c) students may need preparatory or additional instruction (excursions) in comprehension skills and strategies or in content-area subject matter; and (d) the form gloss takes depends upon such constraints and considerations as expected results, elements of the instructional milieu and characteristics of both the reader and the text.

This paper identifies skills and strategies which we have selected as the foci for the process gloss notations we have prepared, and describes guidelines for others who would prepare such notations.

**Skills**

Reading with understanding involves an interaction between reader and text. In order for the interaction to be productive,



the reader must bring certain capabilities to the reading task. In *learning-to-read* situations students usually receive some type of skill instruction, and in many instances they are required to demonstrate competency with reading-learning skills on criterion-referenced tests and/or norm-referenced tests. In *learning-from-text* situations, however, merely "having" a skill in one's repertoire is not sufficient; the successful reader must be able to make appropriate application of the skills in a variety of contexts. We have found that skills usually are not applied spontaneously. "Application" must be demonstrated and nurtured in content-area classrooms as students use reading skills to learn from text.

Reading skills should be practiced and applied, in whatever combination is appropriate for a given task, with the expectation that they will help the reader deal with the main task of getting meaning from the text. In developing specifications for glossing content-area texts, then, one basic step has been to identify a list of skills that we feel are important to reading content-area texts. We selected a list of skills that seem to be both teachable and useful for learning from text. The skills can be clustered as follows:

1. Skills for getting the meaning from words
  - a. determining word meaning from word parts
  - b. determining word meaning from context clues
2. Skills for getting the meaning from sentences
  - a. paraphrasing (synthesizing)
  - b. attending to details (analyzing)
3. Skills for getting the meaning from selections
  - a. determining the central thought of a passage
  - b. identifying relationships and conclusions
4. Skills for identifying sequence.

### Strategies

Specific skills, we believe, are a legitimate focus of instruction to enhance students' understanding of content-area materials. But we acknowledge the need for a broader focus. Consideration of emerging research and theory (Otto and White, in press), interviews of students (Camperell, 1980; White & Camperell, 1980), and surveys of teachers (Morrison, 1980) provide us with a basis for giving attention to more general strategies as well as specific skills.

Of the general strategies we have identified, we have selected four that are frequently described by successful readers and that appear to have high utility in reading most content-area texts. These strategies are: establishing a *purpose* for reading, relating what is being read to *prior knowledge*, attending to text *organization* and/or imposing organization on both new information and prior knowledge, and *monitoring* one's own comprehension. A brief rationale for choosing each of these strategies follows.

**Establishing Purpose.** About three-fourths of the respondents to Morrison's (1980) survey of post-elementary teachers thought that the following "skills"—which together amount to a purpose-setting strategy—were important to reading their subject matter:

1. The student sets a purpose for reading.
2. The student formulates questions relevant to his/her purpose for reading.
3. The student adjusts reading speed to his/her purpose for reading.

In addition, about half of the respondents thought that they would need to help students learn how to apply these "skills." Interviews with students indicate that students, as well as teachers, recognize a need to read for a specific purpose (White & Camperell, 1980).

From a more theoretical-empirical stance, Rothkopf (in press) claims that establishing purposes for reading (or "learning goals," as he calls them) controls the mathemagenic process of selection (i.e., differentiation of processing of a text which results in differences in what is learned from that text). Appropriate control of the selective mechanisms is, according to Rothkopf, necessary for learning.

Establishing a purpose may either be initiated by the teacher or be self-imposed by the student. According to Robinson

(1978), the only strategy that is as effective in improving study-reading as having the teacher establish purposes for reading is having students identify their own purposes. Robinson goes on to suggest that once a purpose is set, a reader can initiate other strategies for comprehending that are consistent with the purpose. This is in line with the aspects of the productive purpose-setting strategy identified by Morrison: (a) once a purpose has been set by the students or the teacher, (b) the students are in a position to develop questions relevant to their purpose, and (c) then the students can determine and adjust their reading speed in view of the purpose.

Establishing a purpose is an important strategy that must be developed systematically. A well-defined purpose goes beyond simply "gaining understanding" to identifying specific goals and reasons for reading. One way to help students develop their purpose-setting strategy is to provide gloss activities which deal specifically with the three related aspects identified in the Morrison study.

**Prior Knowledge.** Recent studies related to schema theory provide a rationale for developing a strategy for *relating prior knowledge to what is being read*. Taken together, the studies make a basic point: what is known affects one's understanding of new material. Results of interview studies conducted by Camperell (1980) and White and Camperell (1980) suggest that students seek to use their prior knowledge to gain understanding in at least three ways: (1) by *relating* the new information in a passage to ideas they have read in preceding passages, (2) by *contrasting* the information they are reading to their prior knowledge and experience, and (c) by *comparing* the information they are reading to their prior knowledge and experience (Camperell, 1980, p. 107).

Smirnov (1973) also suggests that "using" prior knowledge is an important strategy: He talks directly about relating the content of the text to existing knowledge: "... the greater the knowledge with which the new is correlated, the more it is connected with it, and the more recognized are their connections, the deeper is comprehension" (p. 143). The subjects of his interviews said they engage in the following actions when they try to understand text:

1. composing a plan
2. correlating the text with existing knowledge
3. correlating the content of various parts of the text
4. utilizing images
5. translating the content of the text into "one's own language" (p. 148).

Based on Camperell's and White's interviews and Smirnov's work, then, we feel it is important to consider two processes—correlating text content with existing knowledge and correlating content of various parts of the text—in preparing gloss to help students develop the strategy of using prior knowledge. In other words, gloss notations that are intended to develop the strategy of actually using prior knowledge, should help students learn how to relate what they are reading to (a) what they already know or to familiar experiences and (b) information they have just read in a previous paragraph or passage of the same text.

**Organization.** At least 75% of the respondents to Morrison's (1980) survey indicated that students need to develop the "skill" of attending to the organization of material in order to learn content-area subject matter. In addition to *attending*, however, students must actively organize new information as they read; that is, they must organize what they are reading in relation to what they already know. Students must develop strategies for making use of the organization provided in texts.

Herber (1978) suggests that students need to be aware of both the internal organizational patterns of textbooks—such as cause/effect, comparison/contrast, time order, and simple listing patterns (p. 78)—and the external organization of a text, which involves format (e.g., formulas and problems characteristic of math texts or the typographical style characteristic of poetry

or drama texts) and physical features (e.g., graphic aids, tables of contents, and chapter headings). Kintsch (in press) identified six types of expository text organization: identification, definition, classification, illustration, comparison and contrast, and analysis (structural analysis, functional analysis, causal analysis).

If a text does not provide a consistent easy-to-follow organization, students may have to impose organization on the information in order to comprehend. Schallert (in press) speaks of "the human propensity to impose organization upon input." And Smirnov (1973) found in his interviews that one process used by his subjects is the composition of a plan which involves breaking up the material into parts, grouping thoughts, and isolating meaningful points.

To develop an overall strategy of attending to organization, gloss notations could help students recognize and make use of (a) different text formats and external features of text, such as headings and subheadings, that are used in organizing information, and (b) types of text organizations or "text types." After reviewing Herber's organizational patterns and Kintsch's text types, and after studying a variety of expository texts, we identified six types of organizational schemes that we believe may be important in helping students comprehend content-area material: cause-effect, comparison/contrast, sequential order, simple listing, definition, and classification. Gloss notations that are intended to help students develop the strategy of attending to organizational cues and imposing organization on information could make use of such schemes.

**Comprehension Monitoring.** All of the strategies we have discussed so far—establishing a purpose, relating prior knowledge, and both *attending to* and *imposing* organization—are synthesized when the strategy of comprehension monitoring is applied. Comprehension monitoring is a "metacognitive" activity, which, according to Baker and Brown (in press), "entails keeping track of the success with which one's comprehension is proceeding, ensuring that the process continues smoothly, and taking remedial action if necessary." *Active* comprehension monitoring must, however, involve "acting upon" such metacognitive experiences in order to improve comprehension. "Acting upon," according to Yussen, *et al.* (in press) and Winograd and Johnston (1980), amounts to selecting reading strategies that will be most effective in fulfilling the needs of the particular reading situation. "A good comprehension monitor will select whatever strategy is most appropriate to the situation at hand" (Baker and Brown, in press). To monitor comprehension successfully, then, students must not only recognize when they are having problems with understanding, but also (a) be familiar with a variety of strategies, such as the ones discussed above, that can be applied to overcome comprehension problems; (b) be able to select strategies that are appropriate to a particular situation; and (c) know how to apply the strategies to overcome the specific problem.

It follows from these requirements that the comprehension monitoring strategy stands in a special relation to each of the three other strategies we have described. Gloss notations written to develop the ability to monitor comprehension would focus on the interdependence among comprehension monitoring *per se* and the other strategies we have identified. The monitoring strategy is related to setting a purpose in that—as Winograd and Johnston (1980) have pointed out—assessment or control of the subject's purpose for reading is a prerequisite to making generalizations about a reader's ability to detect errors. In order to have criteria for judging their success in comprehending, students must set a purpose for reading. On the basis of (a) the established purpose and (b) their ability to answer the questions they have formulated in line with the purpose (see the discussion of establishing a purpose for reading), students should be in a position to evaluate the adequacy of their comprehension. Gloss notations would, first, help students develop the ability to establish purposes and goals as outlined earlier. Next, gloss

notations would help students (1) become *aware of the need to* evaluate their comprehension in terms of the purpose they set, and (2) learn techniques for evaluating their comprehension in line with the purpose.

Prior experience in performing a particular task and prior knowledge about specific content are also important to successful comprehension monitoring. The purpose of related gloss notations would be to bring about an awareness of the importance of prior experience in evaluating comprehension.

Organization of knowledge, according to Markman, improves comprehension monitoring. Relevant gloss notations could be designed to develop the strategies of attending to the organization of text and of imposing organization on the information presented in text. As Markman (1981) suggests, students should be given "ample opportunity" to work with clearly organized material.

### Guidelines for Glossing

Preparing gloss is a process of making selections. If gloss is to enhance readers' understanding of a given text, then choices must be made as the gloss notations are prepared. The choices include such matters as deciding what aspects of the text's subject matter are most important, what components of the complex process of comprehending the subject matter require emphasis, and what purposes are to be served by this particular reading. We have tentatively identified five guidelines for making the basic choices. The guidelines are consistent with the constraints and considerations (expectations, the reader, the text, and the milieu) depicted in Figure 2, and they pertain to preparation of gloss for any text. (NOTE: For convenience we refer to "the person who prepares gloss" as "the glosser.")

1. *Decide what specific skills and strategies are important.* This broad guideline calls for the most critical choice to be made in preparing gloss. (Of course a crucial *prior* decision—to be made by the teacher or, if someone else prepares the gloss, the glosser or, preferably, the glosser in collaboration with the teacher—has to do with the expected outcomes related to the particular reading assignment. Without such a decision, there can be no next steps. All of these guidelines, then, pertain to the preparation of gloss notations once a decision regarding expected outcomes has been made.) We presented a tentative list of skills and strategies earlier in this paper. We think that they are important and that they are ones used by mature readers. The point here is that anyone who expects to write process-related gloss notations must have a specific list of skills and/or strategies in mind, whether it be ours or somebody else's.

2. *Consider the reader's status with regard to the skills and strategies identified in Guideline 1.* The glosser must be guided by the reader's process-related knowledge. In a given text-reader interaction, the reader presumably will have been introduced to the critical skills or strategies, either through classroom instruction or a process-related excursion. His/her degree of mastery of those skills or strategies will determine the focus and nature of the gloss-directed instruction, e.g., the level of explanation and amount of practice to be provided through gloss notations.

3. *Consider the prior knowledge of content required.* The glosser must be guided by the reader's content-related knowledge. The reader's previous exposure to and mastery of information relevant to the subject area of the text-in-hand must guide choices about the focus and nature of gloss in the same way that facts about his/her process knowledge do. Differing levels of expertise about subject matter—obtained from personal experience, previous classroom instruction, or a content-related excursion—help determine the appropriate level of gloss-directed instruction.

4. *Identify the skills and strategies demands of the text.* Both formal (e.g., the text analyses of Kintsch, 1974, 1979, in press, and Meyer, 1975) and informal (e.g., mapping and outlining



techniques) analyses of the text can yield information that is relevant to the preparation of gloss. This information must be used together with information related to Guidelines 1, 2, and 3. The glosser may be guided, for example, by a variety of text-related questions about organization, such as whether the text is well or poorly organized; whether the reader is skilled in recognizing good or poor organization and knows how to benefit from good, or, overcome poor, organization; and whether the teacher's objectives for the student include his/her mastery of strategies for dealing with text organization.

5. *Be sensitive to the physical and personal realities of the reader and of the classroom.* The glosser must be guided by practical knowledge of what will work in a given milieu. Among the factors that are relevant to this consideration are the amount of time available to read gloss notations and

perform accompanying activities; the nature of grouping arrangements, which acknowledges, in practice, that gloss notations are often written—and the choices prescribed above are made—with "readers" rather than "the reader" in mind; the student's willingness to work with glossed materials; and the technology that is available for producing glossed materials.

Glossing is not a new procedure—as Otto (1980) has pointed out, it dates at least to medieval times, when theologians glossed scripture. We have described guidelines for using this old procedure in new ways: to improve readers' understanding of expository texts by developing and encouraging application of comprehension skills and strategies. We have selected skills and strategies that we believe are important to understanding the text and which seem to be the ones applied by the mature reader.

The figure consists of two main rectangular boxes. The top box is labeled 'GLOSS' on its right side and contains four numbered vertical lines (1, 2, 3, 4) with corresponding horizontal brackets below them. The bottom box is labeled 'TEXT' on its right side and contains ten vertical lines. The page number '28' is at the bottom center.

GLOSS

Figure 1. Text page and accompanying gloss page.

TEXT

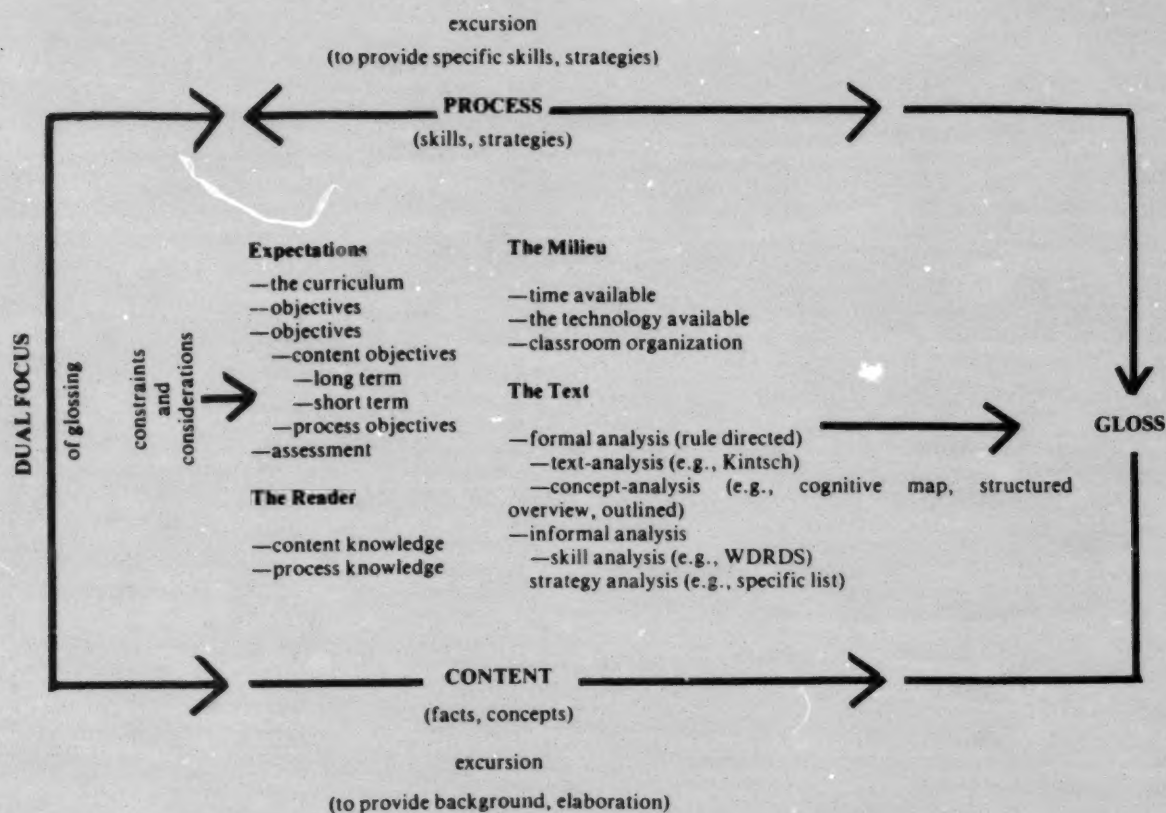


Figure 2. Foci, constraints and considerations for glossing.



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### GLOSSING CONTENT-AREA TEXTS: A VEHICLE FOR INSERVICE TRAINING

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Even though reading educators have for years encouraged, directed, and insisted that reading instruction ought to be part of every content area course, surveys conducted by reading educators such as Early (1973) and Hill (1975) indicate that there are few successful school-wide programs where the emphasis is on the content-area course and the reading specialist serves as a consultant. Many postelementary reading specialists appear to spend their time teaching developmental or

corrective courses, working with individual or small groups of poor readers, administering reading labs, testing programs or sustained silent reading activities. (Witte and Otto, 1981).

Many individuals who begin working in schools as reading teachers have hopes of becoming reading specialists but few seem to accomplish this in any other form than that of obtaining state certification. Any many who start out as reading specialist resort to finding groups of students to teach. The dream every reading specialist has of being sought out by teachers for advice and being invited to assist in course planning and teaching seems to be just that—a dream.

I don't mean to sound pessimistic or to be negative about the role of the reading specialist. I just want to reflect to you some of the things I see, think, and feel after spending two years as a reading specialist in a public school system.

True, teachers do attend reading in-service sessions when mandated by the administration and they do enroll in university level courses when mandated by departments of public instruction. Yet this instruction seems to have made little impact on teachers' perceptions of the reading specialist as a resource person or on what it means to incorporate reading into a content area course. I'm frankly confused about the kind of impact these inservices and courses have had. In attempts to start conversations, teachers have said to me such things as: "I took a reading course once and now I can read a thousand words per minute." or "I always encourage my students to use SQ3R." or "I want to get a new text. Which readability formula should I use?"—On second thought, maybe the reading courses teachers have taken have had a clear impact. And the resulting perceptions have been that reading specialists are concerned with reading rate, readability formulas, and a few well-publicized study techniques. Teachers do not see the reading specialist as someone who can help them convey a complex content through the use of printed materials. Teachers appear to view the specialist as someone who can only help them with short-term tasks such as selecting textbooks or teaching specific study techniques not as a resource person who could be involved with them in the process of creating instructional materials and planning ways of helping students develop the habit of learning through reading. The insights that reading educators have gained in recent years in the areas of text analysis, the reading process, and study behaviors have yet to be conveyed to teachers even though many of these ideas represent a meaningful way of dealing with texts that are often too difficult for students to understand and too boring to sustain a natural interest.

In his opening address to the first session of the American Reading Forum Otto (1981), talked about the gap between research and application. He pointed out that most reading educators either choose to align themselves with researchers or with practitioners and that virtually no one makes a commitment to translating research into practice. Then he tentatively and cautiously suggested that marginal gloss might be a vehicle for applying some of the findings and insights gained from research. As a practitioner and teacher, I'm not sure I know what researchers mean when they talk about translating research into practice. In other words, what would researchers expect to see if someone said to them, "I have translated research into practice." I'm not even sure that the results of research always need to be translated. Maybe they only need to be communicated. But speaking as a practitioner and based on admittedly limited work with small groups of teachers, I believe that marginal gloss does indeed provide a way of translating or communicating the results of research to teachers. The gloss technique is, of course, similar to the Directed Reading Activity and other types of reading guides. yet, because of the way gloss has been conceptualized and developed, it seems to be a technique that easily incorporates theory, specific research findings, and accepted instructional

practices.

Otto (1981) mentioned three categories of studies that he felt could make a contribution to reading education. They were related to the reader, the text, and the interaction of the reader with the text. I would like to give a few examples of how I have seen some teachers respond to the knowledge gained from these studies when it was presented to them in the context of learning how to write marginal glosses.

### The Reader

Writers such as Anderson (1978), Rumelhart and Ortony (1977), and Rumelhart and Norman (1978) have attempted to explain how the prior knowledge of readers affects what they understand and remember. They discuss theories designed to explain how new information can be added to existing knowledge structures without causing change and how new information may result in a returning or restructuring of ideas and learned concepts.

Teachers seemed responsive and interested when these ideas were presented to them. Certainly, the idea of reviewing what is already known before attempting to learn new information and the idea that new information causes change make sense and are concepts that most teachers have used in one form or another. But hearing about the work of researchers seemed to clarify what teachers already knew and to convince them that these concepts are important and should be incorporated into their teaching. And some of the gloss activities written by teachers seemed to reflect an understanding of the concept of prior knowledge. A biology teacher for example wrote, "You think that your heart is on the left side. Right? Wrong! Read the information in 24 and then explain why so many people make this mistake. (Austad, 1981). Several social studies teachers began their gloss activities by instructing students to make a list of important ideas they had or facts they already knew about a particular historical topic. A fourth grade teacher incorporated the prior knowledge concept into her instruction in another way. After she had finished reading *Charlotte's Web* to her class she decided to have the students "do research" or find more information about pigs. But first they listed what they already knew. Following the reading of books, pamphlets, and encyclopedia entries they found that they had to go back to their original list and change several items such as "Pig means someone who eats too much." Apparently they found that left to their own devices pigs are no more inclined to over-eat than any other creature.

### The Text

Kintsch and Vipond (1977) begin their paper "Reading comprehension and readability in educational practice," by lamenting the schism between psychology and education. They point out that for the most part psychologists are not interested in the educational implications of their theories and educational researchers are in general disillusioned by psychological theories that are too crude to be useful. The problem according to Kintsch and Vipond is that educational research instead of being based in psychology has become empirical and atheoretical. They suggest that educational researchers have done many studies and gathered much data on topics that have little depth or relevance to how human being process information. Kintsch and Vipond then present their model of text comprehension and the implications this model has for the educational problem of readability. Readily acknowledging that their model is in an unfinished state, they suggest only that it might provide some insight into an important applied problem, that of matching the reader with printed material written at an appropriate level.

When I worked with teachers to help them learn to write marginal glosses, the first step in the process was to in some way analyze their selected texts. The model proposed by

Kintsch and Vipond and their discussion of the inadequacies of commonly used readability formulas provided a meaningful starting point.

Teachers are familiar with readability formulas and they also realize that somehow these formulas are supposed to assist them to select texts that will match their students' reading abilities. Though most will say that they base their final text selection on other factors such as the focus of the content, the emphasis given certain topics, the equality and type of illustrations, or their own ability to read and understand the text. Teachers also indicate that they are confused by readability formulas. Reading experts say they are supposed to identify the difficulty level of a text but how they do this is not that logical or clear. Science and math teachers who are comfortable with numbers and familiar with how constants like those used in readability formulas are derived seem particularly skeptical. But they were interested in discussions which focused on the idea that readability formulas based on word and sentence length give no indication of the difficulty and the number of concepts presented or of the clarity of the presentation itself. Readability formulas only give a prediction that some typical student at a specific grade level ought to be able to read the passage and answer an unspecified type and number of comprehension questions correctly. And sometimes readability formulas are not even good predictors. It's not difficult to find materials with low readability levels that include very complex concepts. A technical report entitled "The construction and use of a propositional text base" by Turner and Greene begins with a discussion of propositions as abstract word concepts. Beyond a doubt, this discussion would be unintelligible to anyone without an extensive background in propositional analysis. Yet the Fry readability rating for this passage is ninth grade.

But the fact that readability formulas are not always good predictors is not the real issue. The problem is that approaches to analyzing text which are based on empirical evidence rather than carefully thought out ideas encourage teachers to accept simplistic answers instead of becoming actively involved in understanding the text from the viewpoint of a student who knows little or nothing about the subject matter.

Without going into a detailed discussion of Kintsch's system of analyzing text in the form of propositions and arguments, it is possible to explain to teachers that the question they ought to have in mind as they evaluate their texts is: "How well do the words or the surface structure of the language used by the author explain or reflect the concepts the author is trying to convey?" A number of ideas presented by Kintsch and Vipond seem to provide a basis teachers can use to analyze text from this perspective.

Kintsch and Vipond offer a detailed discussion of characteristics that contribute to textual difficulty and use a complex terminology. But essentially what they seem to be saying is that readers need more time to comprehend text that presents many concepts, new concepts, and concepts without interconnections thus requiring the reader to make inferences. They also explain that more time is needed if the reader is required to go back and reread and if the reader is prompted to reorganize previously read information as a result of ideas that appear later.

As a result of a discussion of these ideas, one teacher said something to the effect that the nature of written communication is such that some ideas must be stated first and others must follow even though it would be ideal to somehow demonstrate or explain the complete concept all at once. Rereading and reorganizing are necessary in order to understand many types of written materials. The problem seems to be that students who learned to read through the use of a typical basal program where most of the material is presented in a predictable narrative style, do not seem accustomed to using these strategies.

Following an analysis in which teachers attempted to identify



sections of text where many and new concepts were introduced and where rereading and reorganizing appeared to be required, teachers wrote gloss activities designed to assist students. In a section of a biology text where many ideas were introduced the teacher wrote a gloss activity which directed students to construct a brief outline so that the ideas could be organized and remembered. At points where the text seemed to lack apparent connections or to require inferences, some teachers wrote activities in which students were asked to paraphrase or write summaries. When the text indirectly defined a term through context, one teacher indicated that the definition was in fact indirect thus eliminating the need to make a type of inference. Many teachers made use of gloss activities to direct students to go back to a section of text and reread or to note a concept that would be important when the next section in the text was read.

This approach to analyzing text and subsequently writing gloss activities was certainly not systematized. Yet it seemed to be credible when another reader, myself, read the text and the glosses. Teachers seemed to have glossed those portions of text that were in fact difficult, i.e. that required rereading, reorganizing and a very conscious effort to remember.

### The Interaction of the Reader With the Text

In a comprehensive review of the research on study strategies Anderson and Armbruster (1980) suggested that one study technique or approach is not necessarily better than another. They indicate that the important factor is the involvement of the student or reader in the process of understanding and remembering. Again teachers seemed to accept this idea for its common sense value and to realize that gloss activities could be written which would encourage students to become actively involved.

At first, teachers balked at the idea of drawing brackets on their activity sheets to direct students to the portion of text referred to in the activity. They wanted to just write the activities without bothering with all the lines. But after using the bracketed activities they seemed to be convinced that students were more deliberate about responding to the gloss activities than when they answered questions that appeared at the end of a typical chapter in a textbook. Someone also said that students appeared to be reassured by the brackets. Instead of saying that they couldn't find an answer, they read and reread the material within the bracketed space. In general, teachers' perceptions of students' reactions to gloss activities were similar to my own after I had worked with students as they responded to marginal gloss. Students do perform the tasks required. They do become involved with the text. Often they say that the work is difficult but they also convey a sense of satisfaction once they have completed it.

Writing marginal glosses and discussing the research ideas and insights that can be associated with them appears to be one way of working with teachers and their texts in a public school setting. The gloss concept is comprehensive enough to include many approaches and ideas related to effective reading and studying and teachers seem to accept it for what it is—a credible technique that requires much work and effort on the part of both teachers and students. Perhaps gloss and other similar techniques can be used by reading specialists as they attempt to develop meaningful content area reading programs.

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## GLOSS IN ACTION: GLOSS USED IN REMEDIAL READING CLASSES TO IMPROVE COMPREHENSION OF EXPOSITORY TEXT

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Students at a residential treatment center for neglected and delinquent adolescent boys were having problems reading expository text. As the reading instructor, it became my responsibility to identify and employ strategies that would improve their comprehension. One of the strategies that was used was marginal gloss (Otto et al, 1980).

Marginal gloss was used to improve comprehension of text that was written two or more grade levels above a student's reading ability and contained content in which a student did not have substantial background knowledge. Marginal gloss consists of carefully designed activities that are used for the dual purpose of guiding the reader in processing the text-specific content and providing the reader with practice in reading to strengthen his reading skill. Activities are placed on worksheets. In the left hand margin of each sheet brackets are drawn so that when a worksheet is aligned with a page in text the brackets direct the reader to the exact lines where the reader can find the content to complete the activities. Marginal gloss seems to offer maximum cuing for the student inviting the reader to interact with the text, rather than interact with the teacher to acquire meaning.

To illustrate how gloss was used at the treatment center, three situations will be presented: (1) Using gloss with a severely reading disabled student; (2) Adapting gloss for efficient use with content-area texts; and, (3) Using gloss to facilitate use of a single-level text with students of varying reading abilities.

### A severely reading-disabled student

Bill was twelve years old and had very little schooling. By throwing severe tantrums upon arrival at school, he learned from young how to be sent home. As he got older, his tantrums



became more severe and vandalism and assault accompanied his outbursts. The school system could no longer tolerate his behavior and he was sent to the treatment center.

At the center Bill was enrolled in the remedial reading program. Testing showed that he was at a primer level. He was very nervous about learning how to read. In his initial sessions in reading class, he would hit his fists on the walls, writhing his hands, and pace the floor. Extensive work with Bill, using texts written with a gradual progression of difficulty, improved both his reading proficiency and his self-confidence. The next step was to move Bill from simple narrative text to expository text.

This transition to expository text was very timely. Plans were being made to send Bill to a neighboring public school. At the school he would have to be able to work with expository writing in content-area textbooks. Bill had virtually no background knowledge in the content areas. So a dual goal was established of not only developing the process for reading content-area textbooks, but also developing a knowledge base in content-area subjects. To achieve the goal the text *Regions and Social Needs* by Laidlaw was selected. This text is generally used as a third grade social studies text. The topic chosen for the first unit was desert life. After deciding on the text and the unit, I glossed the text.

A spiral notebook was used in which questions were placed on the back of each sheet in the tablet. The questions focused on the major concepts that were developed in the unit. Brackets were added to the left-hand margin of each sheet so that when the sheet was aligned with the appropriate page in the text, the brackets would point to the lines of text where the content could be found to answer each question. In a typical session, Bill would be assigned several pages to read in a section. After reading the text, he would then use the gloss to help him process the major concepts such as characteristics of desert plant and animal life, and how people live in different deserts.

Gloss was used to help Bill gain the information. Another step in the process was to help him maintain the information. Reading plans (Dana, 1980) were used at the end of each section in the unit to help him remember what he had learned. A reading plan is a skeletal diagram of the text made up of headings to represent the major concepts. Lines and arrows connect the headings to show the relationships of the concepts within the text. Space is provided with each heading so that the reader can fill in the facts that develop the major concepts. Using the facts from the marginal gloss activities, Bill would fill in a reading plan. He would then have a summary sheet of the major concepts to use as a study aide to help strengthen his retention of the content.

In a year and a half, Bill's reading score went from a primer level to a 3.8 grade level. He was enrolled in a public school and succeeded. He was eventually sent home and now attends school on a regular basis.

#### Efficient use of gloss

The second situation in which gloss was used at the treatment center was to assist students who could not read several pages of a content-area textbook and answer simple literal questions on the content. But, unlike Bill, these students did not exhibit as much anxiety nor were they as reading disabled.

Developing a marginal gloss tablet for each student would have been impossible. So I modified the technique. Many content-area textbooks contain question boxes interspersed throughout the text. These questions are used to determine if the student has understood the main concepts covered in the text. I located several textbooks with question boxes directly in the text. Next, using strips of tagboard six inches long and two inches wide, marginal-gloss strips were constructed. At the top of the first strip of tagboard, I wrote the page numbers the student was to read before answering the questions. After reading the pages, the student would come to a question box in

the text. The marginal-gloss strips had a question number, page number, and brackets for each question. To make sure that the brackets would point to the right area in the text where the student could find the answer to a question, lettered slashed-lines were included on each strip and in the text. By matching the same lettered slashed-lines in the text with those on the marginal gloss strips, the two would be properly aligned and the student would know where to find the answer to a particular question. The student would then write the answer to the question in a notebook.

The number of marginal-gloss strips would vary depending on how many questions were in a question box. The strips had a hole punched in the top and were held together with a metal ring so that each strip could be flipped over when it was completed. When the student was finished with all the questions in a question box, he would get his next set of marginal gloss strips.

For most of the students after working with several sets of strips in one textbook a "fading" process began, and student dependency on the strips began to diminish. They were able to recall the information needed to answer a question or could recall the place in text where the information could be found without having to rely on the strips as a guide.

This technique was both efficient and effective. Marginal-gloss strips could be prepared quickly because of the question boxes already in the text. Use of the strips seemed to help the students understand and remember the content.

#### Single-level text

The third situation in which marginal gloss was used at the center was to assist students as they read the drivers' education manual. Students who were going to public schools to take drivers' education were all failing. Several of them approached me for help. The major problem in developing a program for them was having to use a single-level text for students with reading abilities that ranged from third-grade level to eleventh-grade level. Since my schedule could not accommodate private tutoring sessions for all the students, marginal gloss offered a possible solution.

I spent a year developing, testing, and refining the gloss for the drivers' manual. Student involvement helped to improve the materials. For each chapter in the manual there was a separate packet of gloss. Reading plans were also designed for use with the manual to strengthen retention of the content.

In the second year, the drivers' education program was opened to all the students. Twelve students enrolled in the first course. For each chapter the lower level students worked with a packet of marginal gloss, used the packet to fill in a reading plan which was referred to as an open-book test, studied the plan, and took a closed-book test that was designed following the format of the Department of Motor Vehicles' test. Higher level students simply read a chapter, filled in the reading plan, studied the plan, and took the closed-book test. If any student desired, he could take his materials to his room and work on them in the evenings. After a student completed all the marginal gloss packets he was given a cumulative test and a final grade for the course.

I observed an interesting effect taking place while the students worked with gloss. Once they became accustomed to the process of locating information and became more familiar with the content, an automatic "fading" from the need of the brackets in the gloss took place. By the end of the second chapter most of the students no longer needed the marginal-gloss brackets unless the activity was very difficult. Several students were even able to advance from using marginal gloss in the first two chapters to simply using reading plans for the final chapters.

The effectiveness of the drivers' education program seemed positive. Out of the twelve students taking the first course,

nine completed the program.

Marginal gloss is a strategy that was used successfully in several situations to help students having difficulties reading expository text. The effectiveness of the strategy is particularly noteworthy because of the nature of the students. Most of the students had not been successful in school and were easily frustrated. They required instruction that resulted in success. Marginal gloss afforded them success in reading. There is a need to further explore the merits and limitations of this strategy.

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### "IMPROVING READING IN THE DISCIPLINES— DIRECTIONS FOR DEVELOPING AND REFINING AN INSTRUCTIONAL TECHNIQUE": A REACTION

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As reported by Brown, Campione, and Day (1981), there are three types of instructional procedures which have been used to aid student learning. Students can be taught to use a strategy without understanding the reason for the strategy, they can be taught a strategy and informed how the strategy can help them learn, or they can learn how to evaluate and monitor personal performance as they use a strategy. The goal of this third approach, self control training, is to help students learn to learn. It is intended that students will transfer self-learning tasks to various materials without further teacher intervention.

Otto and his colleagues have developed a multifaceted and comprehensive approach to the use of glossing for the purpose of developing independent learners. Their studies have attempted to systematize a set of procedures for teachers and a set of skills and strategies for students. They have developed glossing techniques which accommodate the interaction among the variables of curriculum, teachers, students, and texts.

Rather than attending only to the students' skills, or self-learning strategies, or amount of comprehension gain, Otto and his associates have attended to all three factors. Glossing, or the use of "marginal notes and other extratext notations," is used to direct the students' attention to specific concepts by demonstrating to the student how s/he can use appropriate strategies and skills to interpret these concepts.

Otto and his colleagues suggest a sound and logical progression of stages for glossing notations: (a) demonstration, (b) development, (c) internalization, and (d) fading. Active involvement by the reader in the process of comprehending the text is built into each stage of glossing. Skills and strategies are taught (even some skills, excursions, are taught in isolation) and then applied directly to the text. Students are shown how to use the skills and strategies when they are asked to define, paraphrase, explain and react to the ideas presented in the materials.

Another value of their approach to glossing is the selection of a representative set of skills and strategies which are taught to the students. Rather than presenting a long list of isolated

skills, the four general skill areas interrelate several others so that they can be used in a comprehensive manner. Similarly the four strategies are those that are comprehensive, interrelated and have "high utility" for processing the material.

As Otto and Hayes illustrated, glossing techniques can be applied to a variety of materials. Glossing is appropriate to explain abstract concepts and ideas in content materials (e.g., social studies texts which explain the War of 1812 in two paragraphs or math texts which contain complicated word problems). As Singer and Donlan (1980) indicated, the notations provide a "semantic bridge" between the new information and the students' prior knowledge (p. 332). Also glossing would seem to be appropriate for basal materials, supplementary materials, and skill practice manuals—perhaps even teachers manuals and textbooks. Even though the nature of glossing might vary according to the materials, students' familiarity with the techniques presented in varying materials might heighten the use and application of these skills and strategies.

As indicated in their presentation, the comprehensiveness of this approach requires intensive preparation for both students and teachers. Students need to be taught how to use the skills and strategies at each stage of the glossing procedure. As the notations change with different materials according to the variance in structure and/or concept load, students need to learn to adjust their expectations and use of gloss.

Teachers need to be taught how to prepare gloss notations and monitor their students progress. Neither of these tasks seems to be easy. As Witte indicated, the reading teacher/consultant can communicate ideas of research about the reader, the text, and their interaction as a way of helping teachers understand and develop glossing techniques for their own curriculum needs. To be successful with gloss, teachers need encouragement and a solid knowledge base. They need to be able to identify the goals of their curriculum, assess the knowledge and skill level of their students, and analyze the concepts and structure of the text. Systematic teacher preparation is critical to the success of this technique as is teacher commitment to the project of glossing the text. Witte's description of the process she used to involve the teachers with whom she worked seemed to be an excellent method for teacher inservice. Systematic training can also be developed through teacher education programs in colleges and continuous inservice school programs.

Even with the provision of precise instruction for teachers, some of the teaching tasks remain quite weighty. Assessing prior knowledge and analyzing text structure can be complicated. So far, methods to analyze text structure have produced procedures which are time consuming and probably unrealistic for the classroom and/or content teacher.

As Hayes and Otto indicated, several major questions are yet to be answered. It is not known what the "optimal amount of gloss notation for enhancing" comprehension will be. Nor is it known how to judge the optimal time for each student to experience each stage of glossing. The appropriateness of glossing in different sets of materials and at different levels of instruction remains to be studied.

Otto and his colleagues have advanced the use of glossing with a careful presentation of the theory and practice of this technique and how it interfaces with the various components of the reading process and content curriculum. In their future work, it seems that they will continue to investigate the questions which they have identified and those yet to be established.

There are other questions and problems which may deserve their attention. While it is the goal of this strategy to move students "systematically from one stage of the next", it is also important to identify guidelines to prepare the teacher to monitor student progress. How will it be determined whether students are maintaining and generalizing their use of the varied skills and strategies? How will it be determined when teacher intervention can be "faded"? Perhaps a method such



as the protocol analysis presented by Olshavsky (1976-1977), which asks the students to talk about what they do and think as they read would be useful to determine how students are "processing" the material.

Another question relates to how teachers could individualize the process and skill learning for students. While it may be virtually impossible to prepare a different gloss for each student, methods to adjust and monitor the gloss notations seem to be essential.

Marginal glossing could produce fragmented learning unless accommodations are made in the process of developing the notations. Each marginal notation may help the student understand a section of the text, but the separate notations may not lead to an integrated learning of several ideas. Notations which review previously learned concepts and relate new information to prior learning, and the use of reading-study guides in addition to glossing could facilitate integrated learning. Asking students to talk about their interpretation of the reading and what they were thinking as they studied may be another method to promote integration of ideas.

Otto and his colleagues have made significant contributions to the use of glossing as a technique to help students learn to learn. They have clarified the theory and issues of glossing and have presented a systematic procedure for developing gloss notations. Through their precise study of this strategy, they have identified questions which need to be answered. Research which evaluates classroom practices is needed to further refine the use of this strategy. Glossing has great potential as a method which develops the product and process of comprehension.

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#### USE OF STUDENT-GENERATED QUESTIONING PROCEDURES TO STIMULATE AND PROMOTE READING COMPREHENSION SKILLS OF STUDENTS

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Teachers have been advised, instructed, and urged to use questions and questioning procedures for successive periods over the years. (Hasty examination of the teacher's guides or manuals which accompany various basal reading series for the primary grades will help in quick verification of this.); and they have been and are doing so with relatively great frequency. Various strategies for using questions have evolved and been proposed for guiding readers into doing effective reading of text, especially since the time of Thorndike's oft-cited 1917 report. (Thorndike, 1917), Thorndike suggested that exercises with oral reading be replaced by silent reading in which the student be "guided" in his reading to find the answers "to given questions or to give a summary of the matter read, or to list questions which it answers" (1917, p. 332). Since Thorndike's time, many reading strategies have been proposed to guide

readers in the reading of text; and one of the more frequently used steps in these strategies is the use of questions. (E.g., Washburne, 1929; Robinson, 1941; Gerken, 1953; Wrenn and Larsen, 1955; Morgan and Deese, 1957; Robbins, 1957; Hare and Pulliam, 1980).

Utilization of questions during reading may take two forms. Most frequently the form is one which makes use of teacher-prepared, author-prepared, or text or commercially-prepared questions. Less frequently used is the technique which involves student preparation or generation of questions over the material read or being read. On the basis of such earlier studies as those reported by Germane (1920), by Distad (1927), by Washburne (1929), and by Holmes (1931), and results obtained in many other studies since then, it has generally been conceded that teacher-developed or generated, or other-than-student-generated, questions serve to facilitate reading comprehension and recall. More recently, the effect, nature, and types of questions used and question location and frequency within a prose passage have been the concerns in a number of studies, such as those by, e.g., Frase (1967, 1968); Frase, Patrick, and Schumer (1970); Rothkopf, (1966); Strollo and Bliesmer, (1972); Watts and Anderson, (1971); and in a recent review of the literature by Anderson and Biddle (1975).

Particular impetus was given to studies in this area by Rothkopf's introduction of the term or concept, "mathemagenics," in the 1960's (see, e.g., Rothkopf's 1966 report and Frase's of 1968.) and by Rothkopf's and Frase's extensive research in this area. Many of the mathemagenics studies have also indicated that questions have facilitative effects on recall and that this recall is enhanced when questions come at the ends of passages rather than at other positions. (Bruning, 1968; Frase, 1967, 1968; Rothkopf & Bisbicos, 1967). This has not been a consistent finding, however. Strollo and Bliesmer (1972) found that none of their five treatment conditions (questions before or after selections or passages, interspersed before or after short sections within passages, or no questions) yielded results significantly superior to any of the other treatments. (It should be pointed out, however, that students in some of the groups had emotional problems and appeared to view questions as "test-like events" which, to them, were threatening.)

Benefits also appear to be stronger when student-constructed, rather than multiple-choice, responses are required. Further, higher level questions, such as inference-, evaluation-, and appreciation-type questions, seem to prompt more thorough study and recall and to improve incidental as well as specific learning and recall.

During the past several years, several investigators have been concerned with the effect on comprehension of having students generate their own questions while reading, with the belief, as Morse has stated, "that students can direct their own attention to relevant material through self-questions." (Morse, 1975, p. 2). As a result of one of their studies, Frase and Schwartz (1975) also recommended that students should be urged to ask their own questions while reading so that they might better develop as independent readers. In their study, Frase and Schwartz assigned high school students to tutorial pairs and had them read a biographical passage of some 1,200 words which was divided into three sections. The partners of each pair alternated in generating and answering questions, after each had read the selection. Each partner then read the third selection and studied on his/her own. The means of the questioning and answering conditions test scores differed significantly from those obtained under the read/study condition; but they did not differ significantly from one another.

In a second experiment by Frase and Schwartz (1975), college students (freshmen) read only the first two sections of the biographical passage, with each student generating questions about the first section as he read but reading and studying the second section without generating questions. Test scores obtained

revealed a significant difference in mean scores between the question-generating condition and the read/study condition.

In Schmelzer's study (1975), college student subjects were assigned to one of four treatment groups and read a logic text selection of approximately 1500 words. One treatment group previewed the passage for five minutes and then generated five questions about it; students in a second treatment group were given the passage divided into five sections and were instructed to read each section and generate a question covering the content of that section; a third group read the entire passage and generated five questions about it; the fourth group read the passage twice. While the effects, as judged on the basis of criterion test scores, were "not strong," each of the three questioning groups scored significantly higher than the read/reread group, when the high school rank factor was controlled.

Duell (1977) studied the effects of student-generated questions on comprehension of four passages which described psychological processes by assigning each of his college student subjects to one of three experimental groups. One group received the 4 passages, a list of objectives, and instructions to write questions to match the objectives; a second group was instructed to read and study the passage and the objective; the third group was instructed to take the criterion posttest without reading the passage. The criterion test included lower level, or recognition, items which required recognizing an example of a process copied from the text and higher level, or application, items which required identifying the names of the process represented by new examples of the process. Analysis of test scores revealed significant advantages for writing questions for both low and high level objectives over reading and studying the passages and objectives.

In a pilot study conducted by Chodos, Gould, and Rusch (1977), students in fourth grade classrooms were divided into 4 sections, and were then administered both an immediate and a delayed recall measure. Group 1 students read a 50-word prereading summary of each section and wrote four questions for which they might expect to find answers when reading the selection. Group 2 students generated questions following the reading of each section. Students in Group 3 were instructed to generate questions after reading each summary and also after reading each section (a combination of treatments 1 and 2). Group 4 students read and studied each section with a summary as an advanced organizer. Group 5 students were instructed to read and study each section. Students in Group 6 read and studied two sections at a time. Immediate recall test results indicated significant differences favoring the group which generated questions from a summary over the group which generated questions following the reading. However, on a delayed recall test (given a week later) the group which generated questions from a prereading summary was significantly superior only to the read/study group. There were indications that even poorer readers improved in ability to generate questions; facilitative effects of the student-generated question strategy were suggested; and significant differences found in immediate and delayed recall favored the group which generated questions from a pre-reading summary.

In a brief study reported by Andrei and Anderson (1978), rural high school seniors were assigned to either a questioning-with-training group or a read-reread group, with training in question-generating and administration of the *Wide Range Vocabulary Test* being done on one day and study of the two passages under the assigned treatment and the posttesting being done the second day. Results obtained indicated a greater effect of the question-generating strategy upon the performance of the low verbal ability student than upon that of the high verbal ability group, with the latter groups scoring about the same after the brief treatments, whether they had generated questions or read-reread. The investigators further reported,

after analysis of the generated questions, that a definitely higher possibility of answering a posttest item correctly ensued after generation of a good comprehension question than after generation of a "less than adequate" one.

In a second experiment by Andrei and Anderson (1978), with the same reading passages and training materials, rural senior high school students were randomly assigned to a questioning-with-training, a questioning-without-training, or a read-reread group. The practice passage at the end of the training materials was replaced with one of the 3 reading passages; so each student practiced on one of the 3 passages on the first day and received the remaining 2 for experimental purposes on the second day.

Both the question with-training and the question-without-training groups scored higher on the criterion test than the read-reread group; but the two questioning groups did not differ from each other. Further analyses indicated significant interaction between treatment and verbal ability and between item type and verbal ability, with a significant main effect for treatment and verbal ability. It was also reported that the trained group generated a significantly greater percentage of good comprehension questions and that the probability of correctly answering a posttest item was greater after having generated a good comprehension question than after having generated a "less than adequate" question.

The results reportedly obtained in the Andrei and Anderson studies and the several others which involved study of effects upon comprehension of student-generated question strategies give strong indication that student-generated questions can effect improved comprehension and that training in question-generation can lead to improved skill in constructing good comprehension questions which, in turn, apparently has a positive effect on comprehension improvement.

However, in several reported studies, use of student-generated question strategies did not reveal any significantly different effects. Pederson (1976), in a study in which he used the same materials as those used by Schmelzer (1975), whose study was referred to earlier, reported that he was not able to replicate Schmelzer's results. Bernstein (1973), in a 1973 study and Owens (1977) in a later study were also unable to find an effect for student questioning during a study.

The senior presenter carried on a very brief exploratory probe with two classes of students enrolled in a college reading improvement program during the recent Fall Term. Approximately 40 students were involved. Materials used were rate-comprehension selections from a fairly-wide-used series of commercially-prepared practice materials. Each selection was 400 words in length, was of a lower-high school difficulty level, and was followed by ten commercially-prepared questions over the selection. At the beginning of each of 3 successive class sessions, students were given a selection and were instructed to read the selection and to write five good three-response, multiple-choice questions over the selection. During the first session, a brief discussion of what is involved in or what makes for a good multiple-choice item was conducted before the reading of the selection. After they had read a selection and had written the five items, students submitted their items and the selection and were then given the ten commercially-prepared items to answer. At the fourth session, following the third and last question-writing session, the purpose of the probe was briefly explained; and students were asked to make written comments or suggestions concerning the probe.

This exploratory study was not formally conducted; nor were results formally analyzed. However, student's comments, questions, and performance on commercially prepared questions were read, studied, and analyzed informally. A number of students remarked that many of their questions were practically the same as the commercially-prepared ones; study of their questions supported this. Several commented that they thought



their questions were better than those which accompanied the material; this seemed to be supported in a number of instances too. Some also commented that they thought they were comprehending a selection better by the third session; and perusal and cursory study of successive score changes tended to support this also.

The junior author of this paper also conducted a brief exploratory study with Grade 7 and Grade 8 students in his developmental and remedial reading classes in a Pennsylvania rural area school system. Students tended to respond favorably to this work. Brief exploratory efforts to give training to students in generating their own questions yielded some definitely positive indications.

The real present concern of the present authors of this paper is not only with the possibility of definite significant effects of student-generated question strategies upon reading comprehension skill but also with the possibility of training students in the use of this strategy and with the relative effects of such training at various stages of a student's school life or years. While a few reported studies have involved children at elementary school levels, the majority apparently has been with senior high school and college level students, who have had a considerable number of years to develop, establish, and reinforce skills, be they good or bad. What might be the influence of training in generating questions on the comprehension skills and habit of students at early school levels, such as the primary grades? What types of training might be most beneficial? How long a period might be necessary? How much will the length of training vary according to the level at which such training is started?

It was questions such as those just raised, and study of reports referred to in this presentation and others, which prompted planning for an exploratory study which was discussed in a presentation at this conference last year. (Bliesmer, McMurtrie, and Johnson, 1981). The carrying out of plans for exploratory research and probes which were anticipated in that earlier report were delayed, partly because of "Buckley amendment aftermath" and partly because of unforeseen administrative changes in schools in which subjects for the investigation were to be found. This led to considerable curtailing of the procedures planned and the conducting of the much-briefer-than-planned probes which have been referred to. Study of the various reports and other factors referred to have led to the planning of a study at the dissertation level; and final preparation for formal dissertation proposals are presently in progress.

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#### MNEMONICS: EDUCATIONAL APPLICATIONS

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The purpose of this paper is to describe selected mnemonic techniques and to review research studies that validate the apparent benefits of these memory aids, with the primary focus on strategies and conditions that will facilitate the learning and retrieval of information and, thusly, improve comprehension in content classrooms. Through the use of memory systems, or mnemonics, spectacular displays of memory have been demonstrated with results that have specific applications to educational settings.

Unfortunately, some people think that the development of a good memory is like exercising a mental muscle by practicing

one rote exercise after another. Ebbinghaus (1964) showed the lack of any such analogous relationship when he found that the number of trials required to learn a list of twelve syllables by rote was fifteen times as great as that required to learn six syllables.

The importance of mnemonic devices for the facilitation of recall has been noted in recent surveys of the literature and related research (Ernest, 1977; Higbee, 1979; Hoffman & Senter, 1978). E.g., it has been found that the memory deficits of reading disabled children could be overcome by instruction in efficient mnemonic strategies (Torgesen, 1977) and that the problem solving ability of highly anxious subjects could be improved with memory aids (Gross & Mastenbrook, 1980). Further benefits from mnemonic training were demonstrated by Barclay (1979) when he reported that all his trained subjects maintained mnemonic strategies and showed transfer to new learning situations.

Only in recent years have mnemonics been considered serious and legitimate techniques in learning (Higbee, 1979). With the "knowledge explosion" adding an overwhelming amount of facts to our already vast mental store of data, more demands have been placed on the individual to learn, retain, and recall substantial amounts of this information. Bower (1973), concluding from his research that the basic facts must be learned before higher comprehension skills could be achieved, recommended that we teach mnemonic techniques just as we teach reading and writing.

#### Methods, Research, and Educational Applications

##### Peg-type Mnemonics

"Pegs," or schematically-organized concrete words, have been used to remember numerous items. Bower (1970; 1972) gave some guidelines on the use of peg-words, including these: (a) Both the peg-words and items to be remembered must be made to interact so as to form a single integrated image. (b) The peg-words must be generated easily by the subject or externally provided. (c) More than one item can be associated with a given peg-word, provided the items are elaborated into a unitary image. (d) Semantic similarity among peg-words impairs performance.

Wood (1967) reported the facilitation of recall when peg-words were used by subjects to learn response words and concluded that (a) recall is increased when a peg list is used, (b) there is a correct serial ordering with the peg, and (c) material in the middle of the list is not more difficult to learn than the items at the beginning or end. In addition, Hoffman and Senter (1978) found that with the use of a peg list, accuracy of recall did not decrease when subjects learned multiple lists of related items.

With the rhyming peg-word as described by Lorayne and Lucas (1974), each peg-word rhymed with the number indicating its position on the list such as "one is a bun, two is a shoe, three is a tree, four is a door, five is a hive, six are sticks, seven is heaven, eight is a gate, nine is a line, and ten is a hen." This scheme has been used by the author to remember lists such as the order of the presidents of the United States. Using the rhyming pegs, a visual image was made of each president and integrated with the peg-word. For example, George Washington was imagined wearing a bun in his hair (one is a bun). John Adams was pictured with a large *Adam's* apple and a *shoe* tied around his neck (two is a shoe). Thomas Jefferson was thought of as a *Jef-fer(fir)-son* tree (three is a tree), and so forth.

Logan (1955) proposed another peg system in which the peg-words sounded like their numbered positions: one is won, two is shoe, three is lee, four is gore, five is dive, six is kicks, seven is heaven, eight is bait, nine is dine, ten is hen, and so forth. Using the presidents again, the following sequence could be imagined: *Washington won* the Revolutionary War and the presidency; *Adams wore* a shoe in the Garden of Eden; *Jeff*

was teaching his *son* to play golf so he set up the *tee*. This system could be elaborated to include the dates the presidents took office.

For long-digit number encoding, a system was described by Paivio (1971) which decoded the numbers into words by translating each number into a predetermined consonant sound, e.g.: One was equivalent to the sounds of *t*, *d*, and *th*; two was the *n* sound; three was *m*; four was *r*; five was *l*; six was *j*, *sh*, *ch*, and soft *g*; seven was *k*, hard *c*, and hard *g*; eight was *f*, *v*, and *ph*; nine was *p* and *b*; zero was *z*, *s*, and soft *c*. The vowels and *w*, *h*, *y*, had no value, but were added to the consonant sounds to create words or sentences. This system could be used to remember telephone numbers, dates, statistics, measurements, and so forth. When using this system to remember the dates the presidents took office, the author simply transposed the last two digits of the date to the appropriate consonant sounds, added vowels to make a concrete word, and associated the image with the president. Washington took office in 1789, so 8 and 9 became *f* and *b* respectively, from which the word *fob* was developed and used to imagine Washington with a bright watch *fob* and a bun in his hair. Adams was pictured with his shoe tied around his neck reading a *book* in the Garden of Eden as a cue for 1797, and so forth. Bower (1978) suggested the following sentence in aiding the recall of the consonant phonetic alphabet for digits from 0 to 9: *Satan may refresh coffee pie*.

To visualize each letter of the alphabet, Lorayne and Lucas (1974) assigned highly visual words to the letters of the alphabet: A was ape, B was bean, C was sea, etc. With each assigned cue word sounding like its corresponding letter, recall was enhanced. This system was used to remember anything that contained letters, such as formulas and equations, style numbers, stock numbers, license plates, and difficult spelling words.

The literature has shown that peg-word mnemonics did not greatly increase recall performance when items to be learned were low imagery abstract words (Bellezza, 1981). However, by creating tangible words and sentences from abstractions, and then applying the peg-word system for retention, the learner was always "originally aware" of the number, formula, or list of vague facts to be remembered.

##### Keyword Method

When using a mnemonic device on a list of abstract words, either a semantic or phonetic encoding procedure might have to be applied to the list of items before they can be successfully associated with the mnemonic cue (Bugelski, 1970). The phonetic encoding technique, called the keyword of substitute word method, has been used effectively in teaching a second language (Atkinson, 1975; Atkinson & Raugh, 1975; Levin et al, 1979; Raugh & Atkinson, 1975). In using the keyword, a foreign word was presented and its English translation was to be remembered. An English word, the keyword, was found within the foreign word to be learned forming an interactive image between the keyword and the English translation of the foreign word. For example, the Spanish word *perro* (pronounced pear-oh) which means *dog*, could be remembered by associating the keyword *pear* with *dog* such as having a visual picture of a dog eating a pear (Bellezza, 1981).

Pressley and Dennis-Rounds (1980) found the keyword strategy effective with 18 year-olds who learned a list of cities paired with their products and showed transfer of the technique to a follow-up Latin learning task. Atkinson (1975) summarized the effectiveness of the keyword method when he reported gains in learning sentences, vocabulary, prose, and abstract concepts.

##### The Link

Another method described as an aid in remembering a list was the link mnemonic. The procedure was to form a visual picture associating the first and second words of the list, then forming a completely different image connecting the second and the third, third and fourth, and so forth. The overlapping series acted as chains, and have been shown to improve recall



in a serial learning task (Delin, 1969).

With the story mnemonic (Bower & Clark, 1969), a linking device in serial learning, the user incorporated each successive word on a list into a story that was created as the items were presented. There was little difficulty in distinguishing the items from the words in the story and little interference from other previously formed stories.

Lorayne and Lucas (1974) described the story link procedure after the following news item was read by students for factual recall: "In the history of railroading, few tracks have been laid faster than those of the Tanzam Railway in Zambia. At this moment, it is moving from the Port of Dar es Salaam to Zambia's copper belt" (p. 180). This news item described Zambia and its railway, so a link should be started with a "heading" picture, a substitute thought that would be a reminder of Zambia. The authors used *zombie* as a start of the link for Zambia. They pictured a *zombie walking very fast along a railroad track*; the sun was so hot that it *tans 'im*. This ridiculous picture was a vivid reminder that in Zambia, the railroad tracks were being laid very quickly, and the railway was the Tanzam Railway. In continuing the link, *There is salami* (Dar es Salaam) falling on the *zombie's copper belt*. Millions of pieces of salami were imagined falling, and if a more detailed cue was needed to remember Dar es Salaam, a person could be visualized pointing to a huge salami and saying, "There is salami!"

According to Lorayne and Lucas (1974), applications of the story link were found to slow down reading until proficiency was established, but once expertise was acquired, subjects remembered what they read or what they chose to remember. The link system could be used with all types of reading materials. *Single-use Mnemonics*

Information that should be remembered permanently may have been learned with distinct organizational mnemonics. These mnemonics have sometimes been referred to as "ad hoc" mnemonics (Hunter, 1977). A variety of these mnemonics has been used by both children and adults.

Rhymes have been good at establishing order relations because any mistake in recall destroys the rhyme. Easy to learn and apply, the following rhymes have been commonly used: Use *i* before *e* except after *c*, and, Thirty days hath September, April, June, and November. Baddeley (1976) wrote a rhyme that would allow math enthusiasts to reproduce the value of  $\pi$  to the first twenty decimal places by counting the number of letters in each word:

Pie.

I wish I could remember  $\pi$ .

Eureka, cried the great inventor.

Christmas pudding! Christmas pie!

Is the problem's very center.

Reduction coding was developed to eliminate irrelevant information, thus reducing the amount that has to be stored. First-letter mnemonics are examples: (a) ROY G. BIV helps recall the colors of the spectrum—red, orange, yellow, green, blue, indigo, and violet. (b) HOMES cues the names of the Great Lakes—Huron, Ontario, Michigan, Erie, and Superior.

Adding information beyond what was strictly necessary has been characteristic in elaboration coding. For example, (a) Richard of York gains battles in vain is another way of recalling colors of the spectrum. (b) Every good boy does fine tells the lines on a music staff. (c) Men very easily make jugs serve useful nocturnal purposes. This sentence codes the nine planets in their order from the sun—Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto.

Little research has been done on single-use mnemonics as a method of learning to be compared with other alternative instructional systems. It was found, however, that through the continued use of information learned by a mediating mnemonic, the information became more spontaneous and the use of

the mnemonic aid declined (Atkinson & Raugh, 1975).

#### *Method of Loci*

The method of loci, used by Roman orators to remember speeches, was one of the oldest and most influential mnemonic devices described in Roman books on rhetoric (Yates, 1966). A large number of places in some public building or home were memorized in strict serial order, such that each locus (location) could be clearly visualized from memory. The sections of the speech were reduced to visual images where each image represented an important idea. Each image was placed in the corresponding locus, and the locus was a cue for recall of the image which in turn suggested the idea to be incorporated into the speech.

Snowman, Krebs, and Lockhart (1980) demonstrated the advantages of teaching the method of loci to high-risk college freshmen. The mnemonics group significantly increased their ability to retrieve factual information from prose while a similar group trained in notetaking, main ideas, and vocabulary development showed negligible improvement. Another group of college students trained in the method of loci had significant better recall and higher grade point averages than those students who did not use any mnemonic system (Carlson et al. 1976).

#### **Conclusions**

Although there has been an interest in recent years on the use of mnemonic systems in improving the memory, such interest has been expressed more by the layperson than the educator. Some researchers may think that research on mnemonics is an "unscientific venture," a meaningless pastime of observing gimmicks by entertainers. Several researchers who experimented with mnemonics in the 1950's and early 1960's did not publish their results due to the prejudices against mnemonics at the time (Hoffman & Senter, 1978). Pauk (1974) advised that "Such systems are fun at parties, but hardly applicable for serious studying and learning" (p. 77).

It has been demonstrated that mnemonic systems used in laboratory settings and classroom contexts have had a significant influence on memory performance. Now that attitudes have become more positive toward the study of mnemonics, research should be continued to extend the apparent benefits of mnemonic systems into the classroom. It is becoming increasingly evident that mnemonics are effective aids to recall and should be taught to students as a legitimate part of the school curriculum.

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# **VIYGOTSKY'S THEORY OF INTELLECTUAL DEVELOPMENT: THE EFFECTS OF SUBJECT-MATTER INSTRUCTION ON SELF-REGULATED COGNITIVE PROCESSES**

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Results of current research suggest that text comprehension depends on students actively using background knowledge and executive routines for regulating their own comprehension and learning performance (Bransford, 1979; Brown, Campione, & Day, 1978). One implication of such findings is that comprehension processes and conceptual development are closely related. While researchers have formulated elaborate theories of how knowledge is represented in memory and subsequently used to process information in texts, much less is known about how students acquire new knowledge structures and strategies for controlling their own learning (Kintsch, 1980). Reading educators and researchers realize that instruction in content areas influence the concepts students acquire and use to study and understand their textbooks. Nevertheless, few researchers have examined specifically (1) how content area instruction affects the knowledge structures and cognitive abilities students develop as they progress through school, or (2) how this type

of development interacts with and influences students' ability to comprehend and learn from subject-matter texts.

Perhaps the most widely known theory of conceptual development is that of Piaget (Kuhn, 1979). Educators have relied on Piaget's work for several decades to help themselves understand the intellectual capabilities of children and adolescents. Recently, experimental psychologists also have borrowed from Piaget's theory to explain processes underlying comprehension and memory performance (Brown, 1980). Piaget, however, did not consider instruction and school experiences to be factors that influenced conceptual development in children (Duckworth, 1979). Indeed, a common interpretation of Piaget's theory is that intellectual development results from maturation or biological processes; therefore, children can achieve mature forms of intellectual functioning even if they are not exposed to the types of knowledge and instruction provided by teachers in schools.

The purpose of this paper is to describe briefly an alternative theory of cognitive development. I will focus on the theory formulated by Vygotsky, a Soviet psychologist, because he proposed that instruction in and mastery of subject-matter knowledge are the primary forces underlying cognitive growth (Vygotsky, 1962, 1978, 1979). Since Vygotsky developed his theory nearly fifty years ago, I will begin by discussing why his theory is still relevant to current issues in educational research. I will then summarize his ideas about (1) the origins of higher intellectual operations and (2) the self-regulatory functions of inner-speech. Finally, I will describe global implications Vygotsky derived for educational practice and how these implications apply to comprehension instruction for unsuccessful students.

## **Vygotsky's Influence on Current Research**

Because Vygotsky died in 1934, many readers might assume that his work has no current value. Such an assumption would be incorrect for at least two reasons. First, Vygotsky (1978, 1979) saw social interactions among teachers and students as well as instruction in formal school disciplines as central to children's acquisition of knowledge and self-regulatory skills. A basic premise of his theory is that psychologists will not be able to understand or explain highly developed cognitive skills in adults until they discover how school instruction affects cognitive development in children.

Many comparative psychologists who study cross-cultural differences in memory performance attribute their interest in this area to Vygotsky's hypotheses about the effects of formal school instruction on intellectual development (Cole & Scribner, 1974). Results of these studies raise serious questions about the universality of Piaget's stage model; and, they support Vygotsky's assumption that children's acquisition of conceptual skills varies as a function of the type of education they receive and the level of literacy they achieve (Wagner, 1978; Scribner, 1979).

A second reason Vygotsky's work still has current value is related to his research on the self-regulatory functions of inner-speech. The basic conclusion Vygotsky (1962) derived from his research is that without instruction in subject-matter areas, students cannot develop insights about how their own minds work and, therefore, do not develop the ability to use language (inner-speech) to guide, monitor, and control their own learning. Although American psychologists have not directly addressed the issue of inner-speech as it relates to learning in content area disciplines, the theoretical functions of inner-speech described by Vygotsky underlie (1) current discussions about the construct of metacognition (Brown, 1978), and (2) current research designed to improve the academic performance of unsuccessful students by training them to use executive routines or self-interrogatory strategies (Meichenbaum, 1977; Brown, Campione, & Barclay, 1979).



### The Social Origins of Intellectual Development

What distinguishes Vygotsky's theory from the schema theories of Piaget and others is Vygotsky's claim that all higher level cognitive processes arise out of social experience. Each intellectual function a person acquires, like voluntary attention, concept formation, and deliberate memory strategies, must appear two times: first at a social, external level between individuals, and then at a personal, internal level within an individual. Transfer from external (social) to internal (individual) planes results from a prolonged series of events; but once a function is internalized, the structure and organization of one's mind is changed, moving individuals to higher levels of conceptual ability.

For example, children were seen to acquire symbolic processes like spoken and written language by interacting with their parents, teachers, and other adults. Such interactions allow children to identify and abstract effective means for speaking, remembering, and problem-solving. Internalization occurs only after children have first used cognitive operations in situations where adults or experts verbally mediate and regulate their performance. Gradually children transform or reconstruct these external operations and the means for regulating the operations so that they occur internally. Some operations may always remain external; but if an operation is internalized, the structure of the child's mind is reorganized, creating new abilities in the child which would not have existed otherwise (Levina, 1979).

Thus, Vygotsky proposes that cognitive development results from learning experiences in which children are taught to use various intellectual or cognitive skills through social interactions with others. A basic implication of his theory is that the structure and quality of the intellectual abilities children develop reflect the structure and quality of the social interactions children have had with their parents and other adults. Vygotsky's emphasis on the social origins of development makes his theory of cognitive development distinct from the theories of most Western psychologists (Wertsch, 1979a).

### The Development of Self-Regulatory Speech Functions

While Vygotsky saw all higher mental functions arising out of social interactions, he was basically interested in the regulatory or executive functions of inner-speech (Wertsch, 1979b). Vygotsky's description of inner-speech functions mirrors the American construct of metacognition (Brown, 1978; Flavell, 1979). In both constructs, inner-speech and metacognition, self-regulatory skills are defined as routines people use to plan, monitor, and direct their own cognitive behavior based on insights they have about how their own minds work. For each cognitive function people acquire, like text comprehension, self-regulation appears only after the function has been used and practiced unconsciously for long periods of time. Vygotsky's construct of inner-speech differs from the American construct of metacognition in that Vygotsky (1) emphasized self-regulation as a language function children acquire through social interactions with their parents, teachers, and peers; and (2) attributed the development of this function specifically to students having to learn abstract concepts such as those taught in the academic courses of most schools.

Vygotsky (1962, 1979) defines inner-speech as language used to mediate thinking. The roots of this language function lie in children's acquisition of oral speech, or the ability to respond to and communicate with other people. Inner-speech, however, only develops as students learn ideas that reflect culturally shared and accumulated knowledge. Since schools are established to transmit this type of knowledge, Vygotsky proposed that school instruction induces two interrelated types of cognitive function: concept formation and self-regulation.

### Concept Formation

Vygotsky (1962, 1979) argues that by learning concepts in school students acquire a type of knowledge that is fundamentally different from concepts they acquire through everyday experience. For example, children can acquire and understand a concept like "brother" based on their everyday activities; but they cannot acquire and understand concepts like "manifest destiny" or "exploitation," unless someone teaches them history or other school concepts which make these theoretical ideas meaningful. School concepts are abstract, divorced from concrete experience, and have to be learned as systems of ideas that are organized in superordinate, coordinate, and subordinate relations. Learning such systems creates hierarchical knowledge structures in students which enable them to classify and generalize ideas and to think in relational terms. Students must practice these thinking skills or operations unconsciously under adult guidance before they can subject the operations to deliberate direction and control. But once students grasp the significance of the structure of relations between ideas in one content area, they can transfer and use this type of knowledge to learn more complex concepts in that area as well as concepts in other domains of school instruction.

### Self-Regulation

According to Vygotsky (1979), as students acquire new knowledge, they also acquire routines for regulating and controlling their use of that knowledge. Self-regulation occurs only after students perceive the significance of structural relations among concepts and only after teachers have verbally mediated and guided students' use of the concepts for extended periods of time. From these mediated learning experiences, students eventually acquire language for regulating their own learning, and they do so by reconstructing in their own minds the speech or language forms teachers use to teach them (Wertsch, 1979a, Vygotsky, 1979). Through instruction, students learn what it means when a teacher asks them to remember, interpret, classify, compare, or judge ideas. Understanding these terms and the cognitive operations they label gives students insights about the functions of their own minds. These insights are what enable students to use language consciously to mediate and regulate their own thinking and study behavior.

To briefly summarize, Vygotsky describes self-regulation as an inner-speech function. This function emerges after students have had guided instruction and practice in using abstract ideas like those taught in subject-matter disciplines. His basic hypothesis is that the structure of inner-speech forms students use to control their own thinking reflects the structure of the language their teachers used in teaching.

Both the nature (inner-speech) and the origins (content area instruction) of self-regulation that Vygotsky proposed are obscured in most American research on executive functions or metacognitive routines. Instead, American researchers have simply identified and described such things as (1) the age at which students demonstrate different insights about their own cognitive abilities; (2) the difference between good and poor readers use of self-regulatory or executive functions; and (3) the executive strategies adults use to monitor and control their own comprehension and learning (Kreutzer, Leonard, & Flavell, 1975; Brown & Smiley, 1977; Myers & Paris, 1978; Baker, 1979; Owings, Peterson, Bransford, Morris & Stein, 1979).

Neither the content students are expected to learn nor the type of verbal instruction they receive are major variables in American research. Yet, if Vygotsky is correct, American researchers must control for these variables in order to explain (1) how students develop routines for controlling their own learning and (2) why some students learn to monitor and control their own study behaviors better than others.

### Educational Implications

Since Vygotsky observed that instruction, or mediated learning, typically preceded the acquisition of cognitive abilities, he concluded that "the only good kind of instruction is that which marches ahead of development and leads it" (Vygotsky, 1962, p. 104). Because of this, Vygotsky criticized psychologists who recommended that teachers match instruction to developmental levels of students as determined by their scores on standardized tests. He felt this was misguided because it focused instruction on abilities students had acquired in the past instead of abilities students could potentially achieve in the future.

As previously noted, Vygotsky claims that both the content students learn and the ways teachers mediate student learning influence the knowledge structures students acquire and their ability to activate, or regulate, their own use of that knowledge. Vygotsky (1978) was especially opposed to education programs designed for unsuccessful students in which instruction was aimed at the students' independent level of performance and based only on concrete experiences and concepts. Instead, he felt teachers and schools should push these students in particular to learn abstract ideas and complex cognitive skills. According to Vygotsky, offering unsuccessful students an academically less rigorous curriculum reinforces their learning handicaps and keeps them from acquiring higher levels of cognitive ability.

In many American schools, unsuccessful students are usually those students who have difficulty learning from subject-matter texts. Because they cannot learn by reading textbooks, they are typically (1) tracked into courses specifically designed for academically less capable students, or (2) sent to some sort of remedial class for reading instruction. In both instances, the intent is to match instruction to levels at which students can succeed and then move them to higher levels of academic performance. Vygotsky's theory can be interpreted to suggest, however, that many of the practices associated with classes designed for unsuccessful students may hinder rather than promote their acquisition of concepts and skills that underlie successful, self-regulated learning.

Instruction in content area courses designed for academically less capable students may perpetuate the learning difficulties these students have. Instruction in these classes often is modified so that students are expected to read less material and learn only concrete ideas or facts. Vygotsky argues, however, that the concepts students acquire in school directly affect the intellectual skills they develop. To Vygotsky, abstract concepts are tools of thought which dramatically alter the nature and structure of people's minds. Students who learn abstract concepts, therefore, develop more powerful thinking skills than students who do not learn abstract concepts. Thus, teaching students only concrete ideas and expecting them to apply the ideas by reading less material may maintain students at lower levels of academic and cognitive achievement. As an alternative, Vygotsky suggests that teachers modify the way they mediate and regulate how less capable students learn instead of simply modifying what they expect these students to learn.

A similar problem may occur in remedial reading classes. Perhaps remedial reading instruction helps students develop decoding skills. As it is usually organized, however, remedial instruction might not help students develop comprehension and learning strategies that can be transferred to subject-matter texts. The motivational, easy, and interesting materials used in most remedial classes can seldom be used to teach students ideas that are abstract, related in complex meaning structures, and divorced from students' personal experience or past learning. Yet, according to Vygotsky, only through mastery of this type of knowledge can transfer occur from one domain of instruction to another. Thus, we may maintain unsuccessful students at low levels of comprehension development by not expecting them to understand, remember, and

apply abstract knowledge that can be transferred and applied to understanding subject-matter texts.

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# ADJUNCT AIDS AND TEACHER REGULATION OF LEARNING FROM TEXT

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"Prose text appeals to premises and rules of logic for deriving implications. Whether or not premises correspond to common sense is irrelevant. All that is critical is that the premises are explicit and inferences correctly drawn. The appeal is formal rather than intuitive. As a consequence, the criterion for the success of a statement in explicit prose text is its formal structure; if the text is formally adequate and the reader fails to understand, that is the reader's problem. The meaning is in the text." (Olson, 1977, p. 277)

"Instruction is one of the principal sources of the school child's concepts and is also a powerful force in directing their evaluation; it determines the fate of his total mental development." (Vygotsky, 1962, p. 23)

An ancient philosopher once stated awareness of difference precedes awareness of likeness. In examining the views stated above, the development of models and theories of text processing (basic research) should lead us to the relationship of those models with the real world of classroom instruction (applied research). Unfortunately, that cognitive leap has not seemed to occur. The widespread use of adjunct aids of published textbooks is minimum at best. Since the use of questions and aids thus falls to the purview of teachers, the teachers' role in eliciting meaning from text should be central. Unfortunately, this has not been the case. This paper is an attempt to 1) examine the literature for evidence of teacher regulation of text, 2) propose a new mindset for future research in development of adjunct aids, i.e., the training component and, 3) to raise once again the ugly question of effectiveness of adjunct aids and for whom, under what conditions? Recognizing that the questions are interrelated, so hopefully will be the discussion. Most of the research chosen for the examination in this paper will focus on teacher and student interaction with text. There are a few studies and/or theoretical papers that have attempted to span the bridge from conceptualization to application, but the most promising note is the number of researchers who call for textbook publishers and teachers to become part of the team. Vygotsky, the noted Russian psychologist, addressed this same matter. He felt instruction to be imperative; that children should move from dependence to independence in language acquisition and reasoning and that the main vehicle for this movement must be direct instruction. Adjunct aids are a means of achieving that independence while reading thus setting in motion that "inner speech" that tells children they comprehend and as importantly, an instructional device for teachers in helping their youngsters to become independent readers.

Rothkopf (1981) has drafted a "second assault" addition to the literature of adjunct aids and mathemagenic activities. He began his work in 1963 by manipulating interspersed questions into text. Other factions were indeed busy with the same line of pursuit, only their efforts were not limited to questions. Ausubel's (1960) work with advanced organizers, Barron's (1969), development of structured overviews, Manzo (1980), and Meeks (1979, 1980) with imbedded aids were all efforts to incorporate flexibility and comprehensive reading aids into otherwise immutable text. Rothkopf's current concern is that the relationship between information in text and instructional purpose is a neglected avenue of research (1981). For example, the selective functions of mathemagenic activities are in part regulated by the perceived importance of text elements. Thus, goal-descriptive directions are of value when there is a discrepancy between what the teacher and student perceive as important in the text.

In that goal-descriptive directions are not uniform and thus do not consistently facilitate mathemagenic behaviors, we cannot

conclude that the phrasing of goal descriptions interact with learning. Rothkopf is quick to point out, however, that teachers probably have intuitively formulated goal-descriptive directions, but very little systematic study has been done in this area to determine classifications of directions and with what impact these directions interact with levels of reading ability.

Rothkopf, incidentally, reported positive effects with students who were classified as "ineffective readers." However, he operationally defines "ineffective reader" by measuring how much or how little they learned from the first 24-pages of a 90-page science text, but also, who showed an increase in rate of reading (1972). This is an unusual result as poor readers seldom do well with adjunct aids; however, the definition of "ineffective readers" is hardly one that a seventh grade science teacher would use to describe his/her low ability readers.

In sum, adjunct aids probably make little contribution to text processing in schools. What is needed is a systematic model of application of both learning goals and adjunct questions. Teachers must have formulated text-directed goals and a prioritization scheme as to what is important in text processing. One suggested (and may I add divergent) technique might be a rating system of importance of statements. This procedure was developed by Manzo as one of a series of Imbedded Aids and tested by this author in her doctoral dissertation. The aid was labeled "Rating of Importance of Facts," parenthesis were placed at the end of each fact in a textbook. Students were instructed to rate the importance of each fact on a 1 (high) to 5 (low) scale. The rating of "1" indicated that the student perceived that fact as very important; the rating of "5" indicated that the fact was virtually unimportant. Students were to compare their rating to similar ratings of each fact placed in the margin by the author (or the teacher). If a wide difference between the two ratings occurred, students were instructed to re-read the paragraph and re-evaluate the importance of that fact.

A similar aid, "Rating of Understanding of Facts," was incorporated to further extend reader's monitoring of their own understanding. Each cluster of facts was enclosed in brackets and within the parenthesis placed beside the bracket, students were asked to indicate their understanding of that cluster on a 1 (high) to 5 (low) scale. The rating of "1" would indicate complete understanding and rating of "5" would indicate no understanding. Students were told that when understanding fell below a "2" rating, they were to seek help from the instructor.

Task differentiation is also one of the primary teacher behaviors that can affect text processing. Rothkopf challenges teachers to master strategies other than "read to learn." It would seem that inserted prediction devices might be applicable in purpose setting. Again a useful tool might be the format taken from the series of studies concerning Imbedded Aids. An example of such a device was the aid, "Making a Prediction." Based on facts in the chapter, students were asked to predict answers to specific questions. After an answer was predicted, they were instructed to check appropriate lines of text to determine if their prediction was correct. These aids were included in a cluster of other similar text extensions and labeled Reading/Thinking/Evaluating Skills. Good readers again showed better results than did poor readers. Students, however, were only given cursory instruction with the use of aids. In a second study, statistically significant results were found when the teachers were given systematic instruction in the use of aids in their reading assignments. In reflection, aids appeared to be means of expanding children's schema for reading the passages. Current research has not identified what effect schemata has on comprehension, but in the context of this notion, Anderson and Biddle (1975) remark "We do not need another demonstration that adjunct questions 'work,' (what we need to know) is why they work." (p. 108) I would add, and for whom?, and if they don't work for low readers, why not? My suspicion is that

low readers need more instruction and modifications with use of aids.

Schema theorists emphasize the role of cognitive readiness in acquiring meaning from text. However, only a few attempts at classroom research have been conducted to validate teaching strategies. Moore and Readance (1980) applied a meta-analysis technique on research relating to graphic organizers which was one of the early attempts to translate cognitive readiness into regular classroom methodology. Meta-analysis, a technique developed by Glass (1978), enables reviewers to look at research in a systematic statistical manner, or as they state an "analysis of analyses" (p. 213). What this analysis revealed is startling. Generally small effects were found for graphic organizers as a strategy for learning from text. Again the only population that benefitted was high verbal ability students while reading expository material, and yet three current secondary texts detail the use of graphic organizers. It would appear that application strategies preceded applied research.

Meyer's (1978) work is well-known for its thoroughness as well as its replicability. Her analyses of protocols conducted with ninth-grade students indicates that most high level ability readers used the same schema for organizing their recall of the passage while most low ability students did not. Palmer, Seater, and Graves (1980) re-examined Meyer's work in an effort to determine if simplifying reading passages would aid low ability ninth-grade students. The simplification of difficult vocabulary did not have a significant effect on either student's use of the author's schema or the amount of information they recalled. The notable adjustment to this study was that the materials developed were more similar in nature to those used in classrooms.

With the current emphasis on schema theory, the notion of recall and the qualifying of recalls must be examined. As Vygotsky so artfully stated, . . . "Rather than tapping the child's thinking, often we elicit a mere reproduction of verbal knowledge, in lieu of a study of intellectual process." With the low ability readers, I still do not believe we have tapped the process of reasoning.

Much more research needs to be conducted with these youngsters, looking in depth at their process of understanding text (or the lack thereof). So often in many studies, the subjects are not adequately described so that other research might replicate or extend hypothesis. Who are the children? What is their history of instruction? What sex, race, national origin makes up the experimental groups? Case study research is sorely needed at this juncture in time. Vygotsky would call this microgenetic research. I would modify the notion to study classrooms rather than an individual approach.

In the same vein, an article by Langer appeared in the November, 1981 issue of the *Journal of Reading* entitled "From theory to practice: A Prereading Plan." Langer states "... only general guidelines and a few instructional strategies have been available for helping students realize what they know and how to relate that knowledge to text. Teachers have experimented with ways to bridge the gap. Still, they support that these activities are not as successful as they would like, particularly with the poorest achievers . . . instruction can lead to ineffective intervention without the teacher really knowing what went wrong (p. 152)." Langer went on to describe a technique that she proposes, named Pre-Reading Plan or (PREP). She states that the theoretical framework for this technique is in press, but nowhere does she allude to the research conducted in developing the technique with "real-live" teachers and "real-live" children. Again we must ask, for whom does it work, at what level, in what scenario?

Pearson and Camperell (1981) state that the "renaissance of the methodological study is new (p. 50)" and that students do indeed learn new strategies for comprehending text when they are systematically taught. I would caution researchers to not fall victim to the findings of the First Grade Studies, but to

examine the teacher variable very closely. Studies must investigate how good teacher uses adjunct aids, under that conditions, and with what results. We must develop a practical, working paradigm for text comprehension and I believe we are well on the way, but to use military jargon, "Let's don't send up a new plane without first teaching and training the pilot."

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#### COGNITIVE PROCESS INSTRUCTION: NEW APPROACHES TO LEARNING IN SCIENCE

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The purpose of cognitive process instruction is to apply the techniques and insights on high-order human cognitive processes to problems in education in order to develop instructional programs that teach students how to think. Advocates of cognitive process instruction approach learning from a constructivist perspective. They reject the behavioristic influence on education which they feel has resulted in undue emphasis on product and neglect of process. They consider cognitive process instruction an applied science anchored in observation, and borrow techniques from biology, specifically, ethology or naturalistic observation. These investigators and advocates do not come from the mainstream of educational research; rather, they tend to be scientists, especially physical scientists and mathematicians, and their work has been done primarily with college students.



Essentially, the cognitive process instruction investigators are concerned with developing "good habits of mind." That notion obviously brings to mind "faculty psychology." Cognitive process instruction is like faculty psychology in that it does deal with the idea that disciplined and logical analysis can be taught. It is different primarily in the level of specificity possible. Logical thought is no longer conveyed through Latin; instead, more specific cognitive skills may be isolated and taught. Further the conception of learning is different—in cognitive process instruction the structure is not presented, the teacher is not the giver of knowledge. Instead the teacher is a tutor/coach who helps students develop their own knowledge systems—in other words, the constructivist perspective (Lochhead, 1979a).

Those people who are developing cognitive process instruction are well grounded in the traditional quantitative sciences and realize the limitation of quantitative approaches. Their methods stress naturalistic observation and contextual validity in realistic educational situations. They acknowledge it as a "messy science" on which to base tentative hypotheses, not firm conclusions.

In his discussion of approaches to cognitive process instruction research, Lin (1979) points out that cognitive process instruction is primarily clinical with the purpose of illuminating processes underlying behavior in complex intellectual domains. Therefore, it is concerned almost entirely with complex problems characteristic of higher education; i.e., those involved in solving a physics or math problem, composing an essay, or even understanding a complex text. The major tools are introspection and protocol analysis through "thinking aloud" or interaction with an interviewer with a concern for looking at "why" and "how" a student does what he does. A major goal is to make expert skills explicit, including not just content, but also the nonfactual and nonpropositional knowledge—procedures, heuristics, organization strategies, and values (Lin, 1979).

Most cognitive process instruction educators and researchers work from a descriptive perspective with an emphasis on educational engineering. Lin identifies four basic descriptive model-building frameworks that characterize the work related to cognitive process instruction. They are: (1) a developmental framework, (2) a micro-analytic framework, (3) a diagnostic framework, (4) an instructional or prescriptive framework. Obviously, since the aim of cognitive process instruction is instructional, specific models do not necessarily fit purely into only one framework. Models build on developmental, micro-analytic, or diagnostic frameworks usually have instructional implications, if not complementary prescriptive models.

### The Developmental Framework

A model based on the developmental framework provides a developmental scale along one or more intellectual dimensions onto which judges may map a student. One developmental model is Perry's work on the intellectual and moral development of college students (Perry, 1970). Perry traces the development of college students' views of knowledge along a continuum of dualism—relativism—commitment. Perry's model is interesting both in methodology and content.

First, Perry's work is an excellent example of the validation or verification process used by descriptive research. Secondly, Perry and his colleagues observed that the impetus that moved students along the continuum from dualism to relativism to commitment was not so much the formal college experience; i.e., the coursework: it was rather the interaction, especially discussion, with their fellow students with diverse backgrounds and divergent viewpoints (Perry, 1970). This is consistent with Vygotsky's view of the facilitating effect of collaborative learning (Vygotsky, 1978).

Perry draws no specific instructional prescriptions from his model.

The second developmental model which has received extensive attention in the literature of science teaching is the work of

Piaget on the growth of logical thought. Science educators believe that a large majority of the science concepts taught at the secondary and college levels require formal thinking. However, their research indicates that large numbers of adolescents do not appear to be at the formal level of intellectual development. One review of the literature (Chiappetta, 1976) estimates that number to be 85%. Research done specifically with college freshmen reports from 25% to 40% reasoning at the formal level (Killian, 1979).

Much of this work may be criticized on methodological issues, if not theoretical ones, but it is extensive and consistent enough to convince science educators to develop instructional models and techniques based on its conclusions and the assumption that operations of the formal stage can be taught, and/or that transition from the concrete to formal reasoning can be fostered.

DeCarter, Gable, and Staver (1978) review a number of studies that seem to provide evidence that operations of the formal stage (i.e., controlling variables, proportional reasoning, etc.) can be taught if students have the necessary maturation level. There is not much evidence, however, for maintenance, generalization, or transfer of training.

Two common factors that appear in successful training studies attempting to promote transition from concrete to formal thought are physical manipulation and peer interaction (Ward & Herron, 1980). One teaching approach utilizing these factors is Karplus' Learning Cycles Model. It is a three stage model: Exploration, Concept Introduction, Concept Application. Students work together as they advance through the stages, manipulating the material and devising a system for organizing it (Karplus, 1974). Treatment studies using the Learning Cycles Model have shown positive results when the treatment is extended to at least a semester (Ward & Herron, 1980).

It isn't surprising that science educators have been so enthusiastic about Piagetian theory and its applications since most of the task Piaget used were logio-scientific. There is some question, though, as to the reasonableness and practicality of such a direct application of Piagetian theory to education. Briggs (1980) cites research that shows that the responses of college students on a variety of tasks in physics and other disciplines may jump from concrete to formal or drop from formal to concrete, in a simple test-retest situation. Further, changing the way a question was asked, increasing response time, providing strong motivation, or providing specific instruction in content can dramatically affect the level of responses.

Biggs argues that the Piagetian stages refer to *personalological* characteristics while educators are concerned with *response* characteristics. He suggests that we must distinguish between the developmental base level from which a student is operating and the structure of the outcome of his learning a particular content task. In his opinion, educators can do virtually nothing about the first. They can influence some determinates of the latter (Biggs, 1980).

In fairness to cognitive process instruction investigators, they are obviously more concerned with learning outcomes than with the hypothetical cognitive structure, although some of them tend to cite the data about Piagetian levels as a way of demonstrating the need to instruct differently.

### The Micro-Analytic Framework

Those who work with the micro-analytic frameworks are good examples of the focus on learning outcomes. The micro-analytic framework provides a way of modeling cognitive structure. Micro-analytic models specify the manner in which knowledge is organized, the causal mechanisms responsible for processing that knowledge, and the mechanism by which the structure evolves in time. In this group, we can include Larkin's qualitative models of an expert and a novice solving

standard physics textbook problems (Larkin, 1976). Another example is Clement's analysis (1979) of a beginning student's conception of momentum and force.

Clement's purpose was to evaluate the student's knowledge structure and reasoning processes relevant to causal conception in mechanics in order to take common preconceptions and misconceptions into account during instruction. Clement recorded the student's thinking aloud as he worked on the problem, and then this protocol was analyzed to produce a map of the conceptions that underlie the student's responses. The student did not come up with the "correct" answer, but Clements was able to analyze the student's level of concept development, his ability to identify and manipulate variables, his use of analogies and quantitative functions, and other reasoning processes. From the protocol analysis of this student and other beginning physics students, Clements began to derive a list of common preconceptions that could prove a valuable aid to teachers (Clements, 1979).

Lochhead (1979b) uses a microanalytic approach in a paper which consists primarily of the dialogue between two beginning physics students as they solve the problem of determining a mathematical equation that describes the equilibrium state of a balance beam. The striking characteristic of the dialogue is repetition—as the students repeat and rephrase each other's statements and as they oscillate between understanding and confusion. Lochhead explains these oscillations as being "associated with the learner's need to construct multiple representations of new knowledge and test these representation against each other" (Lochhead, 1979b, p. 149). As the students view the problem with increasing sophistication, their descriptions become more precise. The students themselves detect and correct inappropriate uses of terminology spontaneously once they discover the need. Lochhead observes that: "the correct use of terminology is a natural consequence of understanding, but understanding does not result from skill in the correct use of terminology" (Lochhead, 1979b, p. 177). In summary, Lochhead sees meaningful learning as a slow and repetitive process which can be hindered with too much intrusion by the teacher. Instead teachers need to be able to distinguish superficial knowledge from well-developed conceptions and design tasks that force students to recognize where their knowledge is incomplete (Lochhead, 1979b).

### The Diagnostic Framework

Both developmental and most micro-analytic models deal with behavior over time. They are, in essence, *movies* of the subject. Models in the diagnostic framework might better be compared to snapshots of a subject's behavior. They provide descriptors which are used to diagnose behavior of a particular subject in a given situation. Perhaps, for this reason, they seem to be used less frequently by cognitive process instruction researchers. The classic examples that are drawn upon by the field are Bloom and Broder's (1950) study of the problem-solving behavior of college students and Polya's (1973) work on mathematical heuristics.

Finally, let's look at what cognitive process instruction proponents have written about instruction and at several instructional models that have been evolved.

### The Instructional Framework

di Sessa (1979) calls for a program of research and development for education material, especially in physics and mathematics, which will both "do justice to the powerful logical structure of the subject, but at the same time mesh properly with the cognitive reality of human beings" (di Sessa, 1979, p. 239). She uses the computational metaphor to emphasize the difference between *material* knowledge (directed externally on physical events or abstract relationships) and *control* knowledge (directed internally toward personal functioning

and thinking itself). She points out that the way an expert uses a concept; i.e., the control structure, is as much a part of his understanding as the formal structure of the idea, in much the same way that the control structure of a computer program makes a significant difference in its functioning. Further, process itself can be an effective knowledge carrier.

di Sessa warns against the overuse of the logical formalist metaphor in education—that is, the overuse of axiomatics and the assumption that science is deductive. She calls for a curriculum that takes into account intuition, control knowledge, and experiential support. Thus she recommends that pedagogical material— (1) provide a discovery-rich environment; (2) discuss and develop "higher-level" organization skills; i.e., control knowledge; and (3) be active and constructive rather than prescriptive or descriptive with process as its large scale unifying form (di Sessa, 1979).

D'Amour (1979), on the other hand, takes to task the inductive view of the scientific method as a model for science teaching because it reduces the student to the passive role of merely observing and making the "correct" inferences, and because it assumes that observations can be made independent of theory. Citing Karl Popper's critical fallibilist view, he concludes that the best approach for the scientist and the science student is by initiating a hypothesis and seeking evidence of its untruth. In such a situation what the student comes to accept as scientific knowledge rests on his own effort to disprove it. Science teaching methods must involve the student in actively reflecting on his own thought process while seeking to learn, and hypothesis generation and critical testing. D'Amour says that traditional lab activities are as educationally faulty as the lecture method because the emphasis is on adhering to an ideal model and finding the right answer.

D'Amour recommends the Guided Design methodology developed by Wales and Stager (1978). In the Guided Design, students are presented with an ascending order of well-designed, open-ended problems which they work through in small groups. Critical features of Guided Design are the instructional/feedback pages with leading questions, the group discussion, and the role of the instructor as model/consultant. Solutions to the problems require familiarity with a subject matter unit which is read independently outside of class as part of the background information. "Expert" answers to each question are provided as additional informed opinion, not as the "right answer." This approach helps students shift from seeing knowledge as acquisition of facts to an understanding that useful knowledge is the result of certain thoughtful modes of activity.

Finally, Whimbey and Lochhead (1980) have devised a program for teaching analytic reasoning that has been demonstrated to have positive effects on the math, science, and reading comprehension scores of disadvantaged college students (Whimbey, 1979; Whimbey, et al, 1980). It is an adaptation of Bloom and Broder's method which explicitly presents and teaches the characteristics of good problem solvers. A key to its effectiveness appears to be the method of "loud thinking"—students are forced to verbalize their thoughts, and bad habits, like jumping to conclusions, or misinterpretations or omission of important steps or information become vividly apparent. Students work in pairs, thinking aloud and monitoring one another's processes, as they solve progressively more difficult problems.

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# AN INFORMATION PROCESSING TRIBUNAL (IPT) FOR ADJUDICATING COMPLEX ISSUES IN EDUCATION ... AND PUBLIC POLICY

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"That Irskome, Boring, Vital, Rewarding Experience" is the way *Time* magazine (September 28, 1981) introduced a feature story called "We, the Jury."

A system for hearing and adjudicating the complex issues of

education is so clearly of benefit to all aspects of subsequent decision making that the lack of existence of such a system can only be attributed to a shared intuitive feeling that it would be "irksome", or worse. The term 'Information Processing Tribunal' (IPT) is offered here as a tentative code name for discussing a proposal to formulate such a system despite the lack of apparent enthusiasm to do so.

Discussed below are some of the possible features and a rationale for evolving an IPT system. A straw vote of the members of the American Reading Forum will aid the Board in its final vote to sanction or disallow the following proposal:

It is proposed that a committee be appointed to select, and develop the particulars of, and IPT system, and to undertake one or more complete runs on it, and at the end of not more than two years, to recommend either non-adoption or adoption of an appropriate version of it by the American Reading Forum as part of its annual meeting.

## Tentative IPT System

The particular system developed below is designed to be the most expeditious possible given the nature of the organization and the time and space which separate its members.

### Features:

1. A 'Critical Issues' committee of five ARF members, three of whom should be Board members or designates, first would select the issue to be adjudicated at the following year's conference. The issue to be adjudicated would not require further Board approval unless opposed by a majority of the Board members of the committee. It Board action was required to select an issue, those Board members serving on the committee would be expected to abstain from voting on the issue.

2. Next, the Critical Issues Committee would select, from members expressing a willingness to serve, or so failing, empoinded by collegial arm twisting, a tribunal of three persons to serve both as judge and jury in a "Critical Issue" hearing.

Those so appointed would be required to hold these minimum standards: a rank of associate professor, or some non-academic equivalent, and a record of publication in refereed journals. The person appointed by the committee to preside over the hearing would be required additionally to hold an academic rank of full professor, or some such equivalent.

For the sake of continuity and other such expediencies, the tribunal probably should include at least one, though not more than two members of the Critical Issues Committee.

3. Next the Critical Issues Committee would tentatively select and/or solicit persons to represent opposing views.

Final notification of the particular wording of the issue, of the views represented, and of the persons appointed to represent those views would require the approval of the majority of the judges agreeing to conduct the hearing.

4. The actual hearing would be held at the annual conference of the American Reading Forum.

The number and duration of the hearing session would be determined by the judges.

Judges would be expected to announce a tentative conclusion before the close of the conference. Within 45 days of the hearing(s), the judges would submit a written majority, and if necessary minority, opinion.

5. Opinions would be published in the conference proceedings, exempted from veto by consulting editors, though subject to their examination and recommendations.

6. The final paper would be published as the opinion of the judges. Endorsements of an opinion by the ARF would require a separate motion, probably at the next formal business meeting, or by a mail ballot conducted by an impartial member appointed to do so.

7. Briefs, which ideally would be filed prior to the actual hearing, could be submitted separately as conference papers and would be subject to the usual course of review.

8. Two persons would be assigned to record and monitor, as nearly as is tenable, the 'actual' proceedings.

9. Immediately following the concluding remarks of the advocates, the judges should allow a minimum of 30 minutes for members attending the hearings to raise questions, make comments, and announce or actually file separate briefs with the tribunal.

#### **Rationale for an IPT System**

It now is widely recognized that most issues are more complex than the information at hand for dealing with these. Accordingly, "knowledge industries" now account for over 40% of the Gross National Product. Even where the raw information is available, there is a recognized need for assistance in processing that information, preferably in the form of the considered opinions of authoritative, though unbiased, sources. The popularity of financial newsletters and news analysis magazines attests to this growing fact.

The judiciary system is the least politicized and most respected method for accumulating and processing information on complex issues in civilized societies. In many cases, the evolutionary stage of a nation can be inferred from the size of its knowledge industries and the fairness of the system which it employs to arbitrate differences.

Information Processing Tribunals (IPT's) would be a new addition to the knowledge industry. The IPT would be built upon the judiciary system and designed also to provide a forum for rational change. Without some appropriate place to express alternate views, movements for change tend to become frustrated and grind to a halt, or fall into the hands of persons with radical personal needs. Such circumstances tend to lead either to apathy and/or to a counterpurge mentality.

From other situations we can infer that the need for someone, or something, to guide decision making is so great a felt need that super-authorities are created. These persons usually are avuncular individuals who, without challenge, come to have an influence upon a field far out of proportion to any knowledge base which anyone could hold.

The judiciary system of the United States seems to offer more than one useful model from which academics might evolve a forum from which to educate, arbitrate and/or sanction change. Without pretense of knowing the judicial system intimately, it appears that there are at least these functions within it which can be selected or modified to meet varied demands and issues. There are "discovery" proceedings, for example, which could be held merely to hear facts and clarify issue(s). There are "equity" or "advocacy" proceedings designed to hear arguments on behalf of a position which some may believe to deserve more attention than it might be receiving. And, of course, there are "adversary" hearings where a position stands "accused", and a case is offered against it.

It could take some time to evolve an analog to this legal system which suits the needs and character of the academic community. The effort to do so, however, seems worthwhile since the core of the judiciary system contains features which our current amorphous research and writing schemes do not provide.

There is no place, for example, in the U.S. to bring new curriculum ideas. It is naive to think that these can be promoted on a cell-by-cell basis in the schools or through journals. The latter typically have long periods to elapse between writing and publication, limited and confining space and form requirements, and low circulation.

An Information Processing Tribunal could provide the last, though not the final, word on the issues brought before it. This could be an exercise with far-reaching implications. Written opinions, for example, begin to correct for a great weakness in institutional, or bureaucratic organization: the absence of a memory, and therefore of wisdom.

Even in the most enlightened bureau, or decision making body, records only are kept of the decisions made and rules enacted, but no bureau keeps careful records of the reasons and conditions which entered into its decisions. Thus, while the circumstances surrounding a decision or policy may change, the policy often remains the same, creating massive disharmonies between purpose and practice. A record of each decision along with notation of the opinions and rationale for that policy would ameliorate many such inconsistencies.

In short, an Information Processing Tribunal could be of considerable assistance in providing an unbiased summary of facts with an accompanying authoritative, though non-authoritarian, opinion on such matters. These could serve as benchmarks for decision makers at all levels and in varied circumstances.

The potential benefits of such benchmarks take on international proportions when consideration is given to the world of nations, many of whom may need such information though they have not the resources nor the technology to acquire and/or process it.

#### **Development of an IPT System in Reading Education: Responsibility and Benefits**

As Americans we abhor dictates and central planning, though we have come to recognize too that there are certain problems with unbridled free enterprise. The displacements, disconcertion, and dismay which both central planning and free enterprise can create must be at a high pitch nationwide judging from the increasing number of persons seeking equity in the courts.

IPT is a bit of the hair of the dog that's biting us. It offers the possibility of stemming the tide of litigants seeking redress in overcrowded courts, courts which probably would prefer to defer many such cases to a collegial system of review, or at the least, to have a set of guidelines from such a system for assessing and redressing possible inequities.

Ironically, the need for such a system is *not* so great in our field, which might be the reason that we are able to seriously consider a proposal to be more efficient and effective. Reading Education, undoubtedly, is the most highly sophisticated field in all social science. We have the technology to teach anyone to read. Nonetheless, we sometimes can be quite insecure, permitting confounding influences to send us on seemingly avoidable and costly excursions away from the further honing and refining of this superior technology.

In this regard, I always think of the disproportionately large (or at least so it seemed to me) part which Ernie Rothkopf's theory of "mathemagenics" played for over ten years in studies of reading comprehension and text processing. Reading behavior, in his own words, was merely the vehicle he employed to study something else. The research questions which he raised would have been quite different had the orientation of those studies been school learning and teaching.

There probably is a "natural" selection process which eventually causes the most appropriate ideas and findings to survive. But the process is fortuitous and can take generations. In this vein, consider as another example the issue of model building in reading. With very few exceptions, this aspect of the field has been dominated by non-reading people. Current models fill several volumes and are treated in many courses though it appears that they contribute absolutely nothing to our mission and purpose. The reason for this, I suspect, is that model building has become identified with the "reading process" and with discourse, or language, analysis. These are interesting, though tangential areas of study. These areas address primarily to questions of an epistemological or linguistic nature. The field of reading is not so much in need of models of the "reading process" per se, but of the "teaching-learning process." The teaching-learning process addresses to students and to



instructional outcomes and must contain attention to the role of the teacher (or teaching device), the temperament and abilities of the student, and to related factors such as social-emotional development and cultural opportunity. These elements are hardly to be found in most current "process" models.

It appears that if current models could be taken to a "court of equity" that, at the least, the intimidating effect which these have had upon reading-learning specialists might be broken. In due course we probably could expect to see reading specialists, again, building and employing appropriate models in their work.

A "court of equity", while always at risk of being politicized, or dampening of spirit, on balance, could be invigorating to the extent of providing high level inservice education for professors. The hearings could provide a platform for ideas which any one of us might not have been educated in or otherwise are unable to accommodate in terms of understanding its purported significance.

By way of a small personal example of this, I have not been able to grasp the significance of those things called "psycholinguistics" and the related points attributed to its proponents. Thus I cannot teach these effectively, nor formulate an intelligent position on them. Reading the literature available does not seem to help either; it does not seem to answer the comments and questions which I would like to pose. Thus, while not able to speak intelligently for or against such, and being a bit too ego-defensive to be a judge of this school of thought, I probably could benefit considerably from attending or reading the proceedings in which the opinions of my colleagues would be available to enrich my meager understanding.

#### **Benefits to ARF**

There are several possible benefits to the American Reading Forum in founding an Information Processing Tribunal system. Briefly, the most noteworthy are the following: 1. the crisp debate of critical issues in reading would be harmonious with ARF's name and purpose; 2. the organization, its conference and proceedings would enjoy a feature distinguishing it from other similar organizations; 3. the complete conference proceedings would enjoy the benefits of much wider dissemination if the published accounts of the "tribunal" prove useful to educators and other public policy decision makers; and 4. such popularity could result in greater income and set up the possibility of attracting support from foundations and individuals who may wish to endorse and perpetuate such actions among "learned" societies.

It appears, in conclusion, that an Information Processing Tribunal system could be of considerable value to decision makers, to researchers, to professors, to teachers, to our field, and to our organization. This prospect rests, however, upon whether we can live with the irksome, awesome role aptly summed up in the expression "We, the Jury"(!).

#### **REACTION: AN INFORMATION PROCESSING TRIBUNAL (IPT)**

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Professor Manzo seemingly is disturbed by the apparent lack of orderliness and direction in the field of reading education. His major thesis seems to be that there is an urgent need to process knowledge or information so as to cut the lag time between the generation of new truths and their ready availability to the classrooms and schools as users of the findings. One implied feature of the "tribunal" as a mechanism for promoting

a speeded up application, would be the testing or adjudicating of the information—evidently to determine its worth.

Professor Manzo is undoubtedly aware of the pitfalls and dangers in such a procedure. Any individual or group that takes on the responsibility for judging the merits of any invention, creation or innovation places themselves in a perilous position. First, there is the danger that others in the community will not recognize the tribunal as competent, objective, or capable of doing what it presumes to do. Probably nothing is sadder than the pretensions of those who would lead when no one follows, or of he who counsels when no one listens. Academic and professional circles always have been characterized by variability and diversity. Hopefully, they will remain so because commonality usually leads to stagnation. Any group of authorities tends to project its own beliefs and interests into its rationalizations. It is difficult to think that any new tribunal would do otherwise. Rather than relieving the frustrations Professor Manzo is aware of an additional group of so-called expert judges might in the long run only add to the lag he strives to alleviate.

One can sympathize with the dilemma portrayed by Manzo. It is true that reading education needs better liaison between research and practice. Journals, professional organizations, regional and local conventions, federal and state departments of education and public and private grants have not adequately dealt with the problems of assuring that all children learn to read. It also is likely that all of above mentioned agencies have to some degree served to increase faddishness, espoused concepts that were of little value, and ignored or slighted ideas that might be of immense value. It is unlikely, however, that the proposed tribunal system would do much to compensate for the shortcomings of the present system. Rather than a special tribunal or group of "courts and juries," what is needed is to examine the sociology of reading. This writer disagrees with Manzo that reading education is a sophisticated social science. In our opinion, it is neither sophisticated nor a social science. Classroom teaching whether in reading or writing or arithmetic or any other subject area has limited scientific content. Teachers and reading specialists need to become sophisticated consumers of research findings. Many do not read critically because they lack a proper background in research design or scientific methodology. Manzo is right in recognizing that many of our techniques and methods are not founded on good empirical evidence. What is needed, rather than a court, is a general improvement among professionals in critical judgments concerning reading methods and materials. It should be recognized parenthetically that the most influential reading educators generally are those who have professional and personal ties with those corporations devoted to developing and vending materials for use in the classroom. As such they "live in glass houses" and may become limited in their ability or propensity to be critical scholars. Perhaps what is needed in reading education is a larger group of outspoken critics of their own and other's work. We also need more journals and professional organizations willing to provide forums for critical scholarly analyses of experimental and theoretical concepts. In the long run, the unclogging of existing channels of communication rather than the attempt to add still another agency, in my opinion, would be more productive.

# LITERATURE, INSTRUCTIONAL MATERIALS, AND TEACHER PERCEPTIONS OF THE DEVELOPMENT OF COMPREHENSION SKILLS: A RESEARCH REPORT

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Over the nation, basal readers are widely used as an important part of developmental reading instruction in the overwhelming majority of classrooms through grade six—and, to a lesser extent, in grades seven and eight. It is estimated that 80 to 90 percent of elementary school classrooms use basal reader series in some form (Aukerman, 1981).

Starting at second grade level—if not earlier—most of the selections in the pupil texts are excerpts or adaptations from children's books or periodicals. The teacher's manual suggests an instructional program in which initial instruction in the development of most skills is based upon selections in the pupils' texts.

The selections in the pupils' texts include a variety of types of literature—and often are selections written by well-known and talented writers of children's books. But no basal text was ever intended to be a total reading program. Teachers are encouraged to use selections in basals as springboards for further reading. An excerpt from E. B. White's *Charlotte's Web* is a clue for the teacher to have several copies of the book available at the completion of instruction involving the excerpt. Consequently, teachers are generally expected to maintain a current awareness of children's literature and to incorporate an emphasis on library books to reinforce skills, understandings, and appreciations that have previously been taught.

The purpose of this investigation was: 1) to determine instructional staff perceptions of comprehension skill development, 2) to analyze the comprehension skill development of selected elementary school basal reading materials, and 3) to analyze and recommend children's literature selections and teaching strategies to support skill development in comprehension.

In an effort to accomplish the first of these objectives, the following 12-point rating scale was employed.

## RATING SCALE: USING CHILDREN'S BOOKS TO ENHANCE COMPREHENSION AND ENJOYMENT (Ira E. Aaron, University of Georgia)

**Directions:** The practices listed below are often recommended as guides when using children's literature in enhancing comprehension and enjoyment. Though basal readers depend heavily upon children's literature as the vehicle for teaching reading skills, the emphasis here is on using library books for children to reinforce some skill/understanding that has previously been taught and to encourage students to read for enjoyment. Indicate by drawing a line around the appropriate number the extent to which the practice is being following in your class (or classes). Use the following scale:

- |                    |                   |
|--------------------|-------------------|
| 1—Almost always    | 4—Seldom or never |
| 2—Most of the time | 5—Undecided       |
| 3—Sometimes        | 6—Not applicable  |

- |                                                                                                                                                                 |   |   |   |   |   |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|
| 1. Decoding and comprehension skills are taught systematically to students in order to assure that they can read for understanding, enjoyment and appreciation. | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. Skills that cannot be taught (or taught well) through use of children's literature are developed in other ways.                                              | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. The teacher keeps in mind that often the only purpose for reading children's literature is for enjoyment and appreciation.                                   | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. The teacher avoids asking too many questions                                                                                                                 | 1 | 2 | 3 | 4 | 5 | 6 |

about a book children have read (or have had read to them), recognizing that overanalysis of a selection can interfere with enjoyment and appreciation.

- |                                                                                                                                                               |   |   |   |   |   |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|
| 5. The teacher emphasizes enjoyment and appreciation when poetry is used in instruction.                                                                      | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. The teacher reads regularly to students.                                                                                                                   | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. A wide variety of recreational/informational books on a wide range of reading levels is accessible to students.                                            | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. The daily/weekly schedule includes time reserved for students to read on their own, without too much teacher supervision.                                  | 1 | 2 | 3 | 4 | 5 | 6 |
| 9. Students often share what they read, and time for sharing is provided in the school day/week.                                                              | 1 | 2 | 3 | 4 | 5 | 6 |
| 10. The teacher keeps up-to-date on new children's books and other reading materials.                                                                         | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. The teacher and the school librarian maintain a good working relationship that fosters improved reading instruction through use of children's literature. | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. The teacher enjoys reading and that enjoyment is obvious to students.                                                                                     | 1 | 2 | 3 | 4 | 5 | 6 |

These 12 practices are often recommended as guides for using children's literature in enhancing comprehension and enjoyment. Although statements on the rating scale were not taken directly from any source, elements of all except item 2 are supported by current reading methodology texts (Harris and Sipay, 1980; Smith and Robinson, 1980; Burns and Roe, 1980; Kennedy, 1981; Olson and Dillner, 1982). Based on teaching experience and elementary school staff development, item 2 was added in order to assess teacher perceptions of the feasibility of the use of literature and its alternatives for teaching comprehension skills.

The rating scale was administered to 27 inservice teachers, 26 preservice teachers and 28 paraprofessionals—all of whom were currently assigned to elementary classrooms in grades kindergarten through six. The results are reported in Table 1.

TABLE 1  
RESPONSES OF INSERVICE TEACHERS, PRESERVICE TEACHERS,  
AND PARAPROFESSIONALS TO RATING SCALE ON USE OF  
CHILDREN'S LITERATURE IN TEACHING COMPREHENSION,  
IN PERCENTAGES

| Items* | Inservice Teachers |           |           | Preservice Teachers |           |           | Paraprofessionals |           |           |
|--------|--------------------|-----------|-----------|---------------------|-----------|-----------|-------------------|-----------|-----------|
|        | 1 and 2**          | 3 and 4** | 5 and 6** | 1 and 2**           | 3 and 4** | 5 and 6** | 1 and 2**         | 3 and 4** | 5 and 6** |
| 1      | 78                 | 57        | 61        | 22                  | 31        | 0         | 0                 | 12        | 39        |
| 2      | 70                 | 61        | 43        | 19                  | 27        | 18        | 11                | 12        | 39        |
| 3      | 78                 | 58        | 43        | 22                  | 27        | 22        | 0                 | 15        | 35        |
| 4      | 63                 | 46        | 32        | 33                  | 19        | 18        | 4                 | 35        | 50        |
| 5      | 52                 | 35        | 39        | 29                  | 23        | 25        | 19                | 42        | 36        |
| 6      | 89                 | 50        | 50        | 11                  | 38        | 22        | 0                 | 12        | 28        |
| 7      | 89                 | 81        | 43        | 11                  | 19        | 7         | 0                 | 0         | 50        |
| 8      | 74                 | 61        | 36        | 26                  | 27        | 32        | 0                 | 12        | 32        |
| 9      | 37                 | 46        | 25        | 60                  | 31        | 29        | 3                 | 23        | 46        |
| 10     | 44                 | 38        | 25        | 56                  | 31        | 36        | 0                 | 31        | 39        |
| 11     | 78                 | 50        | 29        | 18                  | 15        | 32        | 4                 | 35        | 39        |
| 12     | 85                 | 50        | 61        | 15                  | 27        | 7         | 0                 | 23        | 32        |
| N=     | 27                 | 26        | 28        | 27                  | 26        | 28        | 27                | 26        | 28        |

\*Items 1-12 in Rating Scale: Using Children's Books to Enhance Comprehension and Appreciation/Enjoyment.

\*\*Responses 1 (almost always) and 2 (most of the time) were combined. Responses 3 (sometimes) and 4 (seldom or never) were combined. Responses 5 (undecided) and 6 (not applicable) were combined for ease of reporting and interpretation.



The discrepancy between perceptions of staff members is apparent in the percentage responses related in Table 1. Item 9 (opportunity for students to share what they read) and item 10 (teacher awareness or currency in children's reading material) were given positive ratings by less than 50 percent of all respondents. The responses to item 10 are consistent with previous research which states that teachers do not maintain up-to-date awareness of children's literature (Russell, 1949; Carter, 1976; Wendelin, Zinck and Carter, 1981). Item 5 (enjoyment and emphasis on poetry in instruction) received the next lowest number of positive responses.

By comparison to these negative perceptions, only three items were given positive ratings by 50 percent or more of the respondents. These were item 1 (systematic teaching of decoding and comprehension skills), item 6 (regular reading to students by teachers) and item 12 (teacher enjoyment of reading). Inservice teachers consistently expressed a more positive perception of their own performance than did preservice teachers

or paraprofessionals as they observed teacher performance.

The analysis of comprehension skill development as presented in selected elementary school basals was the second objective in this investigation. A large number of basal reading series at varied grade levels were reviewed. Basal series' currency and use were the factors which determined selection. Only basal reading series published between 1975 and 1981 were included. Sales reports (Sigel, 1981; Hjalmarson, 1981) and the estimated number of school system adoptions (interviews with basal reading text publishers' representatives; Aukerman, 1981) were used to determine five of the most widely used series from the longer list of current series.

Using the scope and sequence charts prepared by these five basal reading series, the time of introduction and testing of comprehension skill development was determined. The skills sampled were those often included in the categories: relationships, characterization, story problem/solution and critical reading as well as main idea, predicting outcomes and drawing conclusions.

TABLE 2  
LEVELS AT WHICH SELECTED COMPREHENSION SKILLS ARE FIRST INTRODUCED AND TESTED IN FIVE WIDELY USED BASAL READING SERIES

| Skills                        | Series 1 |     | Series 2 |     | Series 3 |     | Series 4 |     | Series 5 |     |
|-------------------------------|----------|-----|----------|-----|----------|-----|----------|-----|----------|-----|
|                               | I*       | T*  | I*       | T*  | I*       | T*  | I*       | T*  | I*       | T*  |
| <i>Relationships</i>          |          |     |          |     |          |     |          |     |          |     |
| class                         | PP       |     |          |     | PP       |     | PP       |     | K        | R   |
| opposites                     | 2/1      | 2/1 |          |     | PP       |     |          |     | K        | P   |
| sequence                      | PP       | PP  | 2P       | PP  | PP       |     | P        | P   | K        | R   |
| cause/effect                  | F        | F   | PP       | F   | PP       |     | F        | F   | P        | F   |
| place                         | 4        |     | 3/1      |     | 3/2      |     | K        | —   | P        | 2/2 |
| time                          | 4        |     | F        | 3/2 | 3/2      |     | K        | —   | F        | 3/2 |
| analogous                     | F        | F   | 2/1      | —   | 3/2      |     | —        | —   | 3/2      | 3/2 |
| <i>Characterization</i>       | F        | 2/2 | PP       |     | 3/2      |     | P        | P   | 1/2      | 2/1 |
| <i>Story Problem/Solution</i> | PP       |     | P        |     | 4        |     |          |     | 1/2      | 2/1 |
| <i>Main Idea</i>              | PP       | PP  | PP       | PP  | PP       |     | PP       | PP  | F        | F   |
| <i>Predicting Outcomes</i>    | PP       | P   | PP       | F   | PP       |     | F        | F   |          |     |
| <i>Drawing Conclusions</i>    | PP       |     | PP       | PP  | PP       |     | F        | F   | 2/2      | 2/2 |
| <i>Critical Reading</i>       |          |     |          |     |          |     |          |     |          |     |
| making judgments              |          |     | 2/1      | 3/1 | PP       |     |          |     | P        | 2/1 |
| distinguishing genre          | F        |     | F        |     | 3/2      |     | 3/1      | 3/1 | 4        | 4   |
| folk tale                     | F        |     | F        |     | 3/2      |     |          |     | 4        | 4   |
| historical fiction            | 3/2      |     | 4        |     | 4        |     |          |     | 5        | 5   |
| fantasy/fact                  | P        | P   | F        |     |          |     | 2/2      | 2/2 | 2/1      | 2/1 |
| <i>Reference Source</i>       |          |     |          |     |          |     |          |     |          |     |
| location                      | 4        |     | 4        | 5   | 4        |     | 2/1      |     | 5        | 5   |
| <i>Author</i>                 |          |     |          |     |          |     |          |     |          |     |
| expertise                     |          |     |          |     |          |     |          |     |          |     |
| purpose                       |          |     | 3/2      | 3/2 | 4        |     | 2/1      |     | 5        | 5   |
| bias/opinion                  | 4        |     |          |     |          |     |          |     | 5        | 5   |
| <i>Evaluation of</i>          |          |     |          |     |          |     |          |     |          |     |
| Character actions             | 2/2      | 2/2 |          |     |          | 2/2 | 2/2      | 2/2 | 3/1      | 3/1 |
| <i>Fact vs. Opinion</i>       |          |     | 3/1      | 3/1 | 5        |     | 4        | 4   |          |     |

\*I = Introduced    \*T = Tested

The grade level at which selected skills are introduced and tested varies from series to series as shown in Table 2. There is variation also in the labels which are given to specific skill one development. For example, one series may label an activity as "predicting outcomes" while others will categorize similar pupil material under the broad label of drawing conclusions. The grade level at which skills are introduced are sometimes dramatically different from one series to another. As families and school children move about the country from one school system to another and often from one basal reading series to another, it is apparent that developmental sequencing of instruction may be difficult.

Specificity in scope and sequence charts vary from publisher to publisher. In selecting instructional materials, a teacher must look carefully at the components of a program as well as the author and/or publisher's interpretation of the program in a scope and sequence chart.

An emphasis on comparison of published materials, (labels, levels of skill introduction and testing, levels of reinforcement or maintenance of skills) should direct attention to the philosophy or basis upon which such decisions are made. Such an analysis strengthens the construction and the selection of materials.

The third objective in this project focused on children's literature selections as a part of skill development in comprehension. Based on the reading of contemporary children's books, a number of titles were selected to demonstrate how specific books might be used to develop comprehension skills that have previously been introduced. These are categorized under four skill headings.

TABLE 3

#### SKILL DEVELOPMENT THROUGH USE OF CHILDREN'S LITERATURE: SOME SAMPLES

##### Relationships

1. Study the pictures in *Noah's Ark*. Is the story set in modern times or a long time ago? How can you tell? Identify as many pairs of wild animals as you can. Do the same for farm animals. (Illustrated by Peter Spier, Doubleday, 1977.)
2. Why did the Herdman children go to the meeting where parts for the Christmas Pagaent were being assigned? (Barbara Robinson, *The Best Christmas Pagaent Ever*, Harper and Row, 1972.)
3. In Doris Buchanan Smith's *Last Was Lloyd*, why did Lloyd want his classmates to think he could not hit a ball? (Viking, 1981.)

##### Characterization (Traits/Actions/Feelings)

4. How did Ramona feel about her mother's relationship with her and her sister Beezue? Do you think she was justified in her beliefs? Why or why not? (Beverly Cleary, *Ramona and Her Mother*, William Morrow, 1979.) Compare Ramona's feelings toward her father in *Ramona and Her Father* (William Morrow, 1977) with those she had for him in *Ramona and Her Mother*.
5. In *Ramona Quimby, Age 8*, Ramona now is a "big girl." How does she now feel about her mother? her father? "Yard Ape"? Beezue? Mrs. Whaley? Willa Jean? (*Ramona Quimby, Age 8*, William Morrow, 1981.)
6. In Betsy Byars' *The Cybil War*, which character do you like best—Simon, Cybil, or Tony? Why? Would you want a friend like Tony? Why or why not? (Viking, 1981.)
7. In Delores Beckman's *My Own Private Sky*, how did Arnold and the other children feel about Pilgrim? How did Pilgrim's age influence their feelings about him? (E. P. Dutton, 1980.) (International Reading Association Award.)

##### Story Problem/Solution

8. What was the story problem in Bill Peet's *Big Bad Bruce*? How was it solved? (Houghton Mifflin, 1977.)
9. What was the story problem in Madeleine L'Engle's *Dragons in the Water*? How was it solved? Was the solution a realistic one? Why do you answer as you do? (Farrar Straus Girous, 1976.)
10. In *Miss Nelson is Missing*, what is the story problem? How was it solved? Could this story really have happened? Why or why not? (Harry Allard and James Marshall, Houghton Mifflin, 1977.)

##### Critical Reading

11. We have read three books of Maurice Sendak—*Where the Wild Things Are*, *In the Night Kitchen*, and *Outside Over There*. Some people say these are "scary" books. Do you think so? Why or why not?

Which did you like best? Why? The illustrations in the three books are quite different. Which ones do you like best? Why? Could any one of these stories really happen? Why? (Harper and Row, 1963, 1970, 1981.)

12. In *Kevin's Grandma*, by Barbara Williams (writer) and Kay Choroa (illustrator), which boy—the narrator or Kevin—do you believe? Or do you believe both boys? Why? (E. P. Dutton, 1975.)
13. Is the setting in Lloyd Alexander's *Westmark* historically accurate, or is it fantasy? Explain your answer. (E. P. Dutton, 1981.)
14. Mrs. Bly, in Robert Newton Peck's *Justice Lion*, was an unusual person. Which of Mrs. Bly's traits did you like? Which did you dislike? Why? (Little, Brown, 1981.)

The samples listed illustrate what might be done where a book has been read by an individual or several children or the teacher has read a book—chapter by chapter over as many days as there are chapters—to the children.

Teachers and their instructional materials, particularly basal reading series, have received in the past and do presently receive considerable criticism. Such criticisms are not always based on careful analysis of current practices and materials. The criticism should not be eliminated. On the contrary criticism is vital to improvement in designing, selecting and using teaching strategies and materials. However, criticism *should* be based on careful evaluation. The current 1) study of teacher perceptions of practices, 2) analysis of reading materials and 3) suggestions for the use of materials is one effort in such an evaluation process.

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## READING IN THE DISCIPLINES: USING SPORTS TO STIMULATE CRITICAL THINKING

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Effective reading and thinking are congruent with affective stimulation. If what a person reads lacks emotional appeal, i.e., is unmeaningful or unmotivating, the residual effect will be short-lived and inconsequential.

One area that is provocative and has great meaning for many young people is sports. There is no question that athletes and athletics exert a major influence on people all over the world. Reggie Jackson, the renowned star of the California Angels, recently remarked:

Fifty years ago it was Bogard and Cagney. Twenty-five years ago it was Elvis Presley and Chubby Checker. Now, it's the age of the athlete.

Teachers can make good use of the current passion for sports and sports figures by combining reading instruction in the disciplines with sports-related written material. This approach is especially effective in getting students to *become actively involved with what they read!*

One of the most disconcerting problems faced by teachers in the academic disciplines concerns, not so much students' inability to read, but their helplessness or resistance to thinking deeply about what they read and responding with some measure of critical intensity. These teachers claim most of their pupils can "bark" at print or call the words. However, they frequently fail to "come to grips" with an author's ideas and wrestle intellectually with the text. In the words of Hilda Taba, "they do not generate a 'cognitive commerce' with the printed page."

If one accepts the definition of reading as "thinking," or a medium for employing print as a stimulus to reasoning, and if one agrees that a person can only think about something to the extent that individual has a basis of knowledge or experience concerning it, then it is not surprising many students, given their lack of knowledge and experience in various subject fields, have great difficulty thinking about, understanding, and appreciating much of what they read in school.

Moreover, for critical reasoning to occur as a consequence of reading, the material itself must suit a person. The reader must be motivated and have a background of vicarious or real-life experiences which relate to the reading assignment. These serve as the building blocks which a person uses to interpret what is read and reconstruct or extend understanding. In the final analysis, comprehension and recall are by-products of concentration which is the outgrowth of an aroused interest on the reader's part. Bigge (1971) claimed:

Content that is no so brilliantly structured, but still has much meaning, will be remembered in proportion to its meaning. Nonsense material is headed for extinction before the last syllable is uttered. (p. 290)

The unmeaningful interaction between many students and their textbooks and their failure to exchange ideas, opinions, or sentiments, with supplementary exposition, may account for why so many of them are quick to answer "It's boring," when asked why they do not like this or that subject. In essence, they are saying, what they have read does not speak personally to them and makes no sense to their lives. This may happen for two reasons:

- 1) Many students lack the language experiences to appreciate fully or understand what they are asked to read in school. Many teachers fail to consider these deficits. They overlook the need to use concrete examples as a means of introducing students to those facets of language (orthographic or vocabulary) with which they are unfamiliar.
- 2) Many students lack the vicarious or real-life experiences that allow them to read content based materials insightfully. Many teachers fail to relate new ideas, information,

or learning experiences to students' lives by placing the aforementioned in a context with which they can identify and one through which they discover some personal meaning and value.

Sports happens to be one very meaningful context for a large number of students. These youngsters have developed a wealth of language as well as vicarious or real-life experiences in sports that teachers can use as a backdrop for further learning. The former have watched live sports contents and have seen them on television as well. They have listened to broadcasters, players, or performers describe the action or circumstances surrounding various games and events. In doing so they have acquired sophisticated vocabulary and concepts related to athletics.

Additionally, these students have accumulated a large store of facts and statistics concerning the history of sports, sports figures, rules, strategies, events, and teams. Many are stimulated to *apply or demonstrate* what they know and frequently they *want to learn more!*

Sports and reading instruction in the disciplines do hand-in-hand for several other reasons:

- Both sports and reading skills in the disciplines can promote independence, aggressiveness, assertiveness, ambitious desire for achievement, success, prestige or recognition, self-control and a sense of mastery.
- The two areas require sound coaching/teaching methods; good models; structured, consistent, and individualized guidance; continuous reinforcement; sequential acquisition of fundamental skills; plenty of practice; and a lifetime of development.
- The physical fitness boom has captivated men and women, young and old, able-bodied and handicapped alike. Because of this intense public interest in athletics, sports magazines, the sports sections of newspapers, biographies of sports heroes, publications containing sports quotes, superstitions, poetry, and humor can be used by teachers to accelerate students' reading skills in the disciplines. They can: (1) provide students with opportunities for vocabulary and language enrichment; (2) appeal to their interests and encourage them to become active readers instead of passive word callers; (3) give students opportunities to distinguish between fact and opinion; (4) provide chances to collect and organize data; (5) prompt students to locate likenesses and differences in their reading and urge them to criticize an author's ideas or evaluate them for strengths and weaknesses; (6) inspire students to do inductive as well as deductive thinking and stimulate interpretive or creative levels of assessment; and (7) expose students to various circumstances which require them to perform problem solving operations.

### Suggested Activities

Teachers can employ sports-related reading materials to supplement curricula in various academic disciplines and motivate students to practice and apply reading/thinking skills at higher levels. The following types of activities are easily incorporated into the areas of English, math, social studies, health, and science. These examples are not meant to be whole instructional packages, but to serve as models from which classroom teachers might generate numerous other activities in their specific subject fields. They should not be employed as simply paper and pencil drills. A more acceptable approach would consist of using these ideas to stimulate group discussion and provide a context wherein students are encouraged to practice related reading or writing skills. Those teaching in lower grades can modify the language or format of these to suit their specific purposes.

### Sports in English or language arts:

Using the following kinds of statements from newspapers or sports magazines, instructors can stimulate students' interest in vocabulary, language, math, and social studies while encouraging them to recognize simile or metaphor, perform deductive/inductive reasoning, and calculate solutions to arithmetic problems.

Last year, neither Baylor nor Singleton could throw a baseball through a spider's web. Baylor's arm has always been considered as useful as adenoids.

Directions: Ask students to read the above statement and respond

to the following questions:

1. Why has the author used the image of a "spider's web" to describe Baylor's and Singleton's pitching? (Metaphor)
2. What does the statement, "As useful as adenoids" mean? (Simile)  
True or false: Defend your answers!
1. Baylor has the better throwing arm.
2. Singleton's arm is much stronger than Baylor's.
3. Baylor and Singleton both pitch.
4. They both play baseball.

- The favorite sports of Bruce, Harvey, Ike, and Teresa are baseball, hiking, ice skating, and tennis.

Directions: Ask students to read the above statement and keeping in mind that no person's name begins with the same letter as his or her favorite sport respond to the following true/false statements:

1. Teresa and Harvey do not like team sports. (Explain)
2. Harvey and Bruce do not like cold-weather sports. (Explain)
3. What is each person's favorite sport?  
• More and more ballplayers, you may have noticed, are to be seen digging handfuls of small things from their pants pockets, popping them into their mouths, executing complex masticatory maneuvers and spitting out little flecks into the breeze.

Directions: Ask students to read the above statement and answer the following true/false questions:

1. The author is probably referring to football. (Defend your answer)
2. Masticatory maneuvers refers to jumping up and down. (Explain!)
3. The ballplayers are probably popping raisins into their mouths.
4. If you think the answer to number 3 is false, identify what the players are doing.

To teach sports poetry, have students read, for example, "To An Athlete Dying Young," by A. E. Housman, and answer the following questions:

1. What is the tone of Housman's poem?
2. What sense do you get for an athlete's future?
3. Is there any value in having been a great athlete?  
Why or why not?
4. What is the author's advice to those who would so dedicate themselves?
5. Does the author leave you with a feeling that fame and glory are longlasting and highly prized?
6. Write a poem of your own expressing your feelings toward a sport or great athlete.

To get students interested in reading biography, introduce them to a brief episode taken from a book and used as an "interrupted" story. For example, an instructor might excerpt a couple of pages from *Jesse*, by Jesse Owens and Paul Neimark and copy these for the class. Try and choose a portion of the story that tells of a dramatic moment in the individual's life or a part that you think is sure to "hook" the group and stimulate real interest. After reading the selection and discussing it, make a couple of copies of the book available to students. Give the students a date and time to report to the class on some further events in the life of Jesse Owens.

To interest students in broadening their vocabularies and challenge them to make generalizations or inferences, ask them to look over the following list of clues that will provide them the necessary information to pick the National Football League team and match the correct city and corresponding mascot:

| Clue                    | City            | Mascot         |
|-------------------------|-----------------|----------------|
| Example—King of beasts  | Detroit         | Lions          |
| 1. Army insect          | (New York)      | (GI/ants)      |
| 2. 7 squared            | (San Francisco) | (Forty niners) |
| 3. Bad news             | (Chicago)       | (Bears)        |
| 4. A 747                | (New York)      | (Jets)         |
| 5. Hostile attackers    | (Oakland)       | (Raider's)     |
| 6. Various iron workers | (Pittsburg)     | (Steelers)     |
| 7. Suntanned bodies     | (Cleveland)     | (Browns)       |
| 8. IOU's                | (Buffalo)       | (Bills)        |
| 9. Help to relocate     | (Green Bay)     | (Packers)      |
| 10. Flipper's family    | (Miami)         | (Dolphins)     |

#### Sports in Math and Social Studies:

Have students read statements like the following and answer

the questions:

- Last year Tony Dorsett ran for a total of 1,680 yards. Ron Springs ran for 1,120 yards. Robert Newhouse gained 890 yards rushing.
- 1. How many yards did Dorsett and Newhouse gain on the ground?
- 2. What is the total number of yards gained by all three runners?
- 3. What is the difference between the total yardage compiled by Springs and Newhouse? Between Dorsett and Springs? Between Newhouse and Dorsett?

The same three running backs caught passes totalling 650 yards for Dorsett, 598 yards for Springs, and 425 yards for Newhouse.

1. What is the total number of passing yards gained by the three players? Is it greater or less than the total rushing yardage?
2. What is the difference between the number of yards Springs was able to gain on the ground compared to those he gained through the air?
3. Why do you suppose the totals are much less for passing as opposed to rushing?

Have students read statements like the following and answer the accompanying questions.

- Davis was paid \$225,000 for his first fight—\$185,000 by CBS and \$40,000 by promoters in the "Big Apple." He has three more fights on the same contract with CBS, each calling for \$185,000.
- 1. What percentage of Davis's first fight was paid by CBS?
- 2. What is the difference between the percentage paid by the promoters and that paid by CBS?
- 3. How much does CBS pay Davis for all four fights?
- 4. What are Davis's total earnings for this contract?
- 5. In what city was the first fight held?

#### Sports in Health or Science:

The ability to keep records and read graphs, charts, and pictorial material is important in many content areas. Students must make assumptions, comparisons, inferences, and conclusions based on these diagrams. The following activity provides students with one such reading opportunity and requires them to record, collect, organize, and interpret data.

Provide students with stop watches. First, pair students for recording each others pulse rate at rest. Ask them to record these statistics on a chart. Discuss the differences among class members. Next, ask them to take turns running in place for two minutes and record these figures as well. How do the rates differ? Why did they increase? Finally, ask them to measure the heartbeat after a two-minute recovery period. How many returned to their original rates? Why are some about the same as they were at rest, while others are still somewhat accelerated?

As a follow-up activity, ask for volunteers to go on a jogging program for two weeks. At the end of that time, have the whole class repeat the experiment. Are there any differences between the volunteer joggers' figures and those of the rest of the students? Discuss reasons for these changes.

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## REACTION: USING SPORTS TO STIMULATE CRITICAL THINKING

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The Greeks believed you could not separate educating the mind and the body. While they emphasized physical games and contests and maintaining healthy bodies, they especially stressed reading and other forms of education. No doubt, if this ancient empire were confronted with educating today's youth to read, they would choose print related to the student's interests to promote critical thinking and reading skills. Gentile advocates the development of thinking and reading skills instruction in the respective content areas through the use of sports materials. The contention is to capitalize on the students' interests and actual experiences. Any teacher/administrator who has taught school is cognizant of the majority of students' interests in sports, physical education, and health classes. Using materials related to their interests is another way of working with their affective and cognitive strengths to alleviate weaknesses in the cognitive development of initial thinking and reading skills.

It is logical that when students read and think about material in which they are both knowledgeable and interested, they are more capable of operating at different levels of comprehension. Teaching and practice in the development of thinking and reading skills using such models as the Barrett and Bloom taxonomies in conjunction with high interest sports materials could very well carry over to advancing these skills in other content area disciplines.

Stauffer (1969) defined reading as a thinking process and Smith & Dechant (1961) define reading as experience brought to the printed page. These operational definitions of reading lend credence to the author's attempt to ameliorate the teaching of critical thinking and reading skills based on students' primary interest areas. From the psychological principles of learning we need to practice teaching the unknown based on the known. Therefore, as teachers we can develop students' higher intellectual thinking processes by having them interact with their peers and teachers on topics in which they are involved.

Issue could be taken with the author on one specific manner of how "sports and reading instruction in the disciplines go hand-in-hand . . .". It is interpreted by the reviewer that his list of comparisons are meant to be of a positive nature. Therefore, the term aggressiveness might be deleted in that his point on assertiveness should make the probable desired comparison.

Many of today's sports commentators are very articulate. A large number are former athlete/celebrities in the respective sports. The vast proportion of students interested in sports and famous athletes can identify, thereby accepting and emulating, the excellent language facilitation modeled by these television and radio announcers. Most of us learn by modeling after others. Students listening to the vocabulary and analytical abilities of these reporters can adapt their language and thinking skills in other disciplines.

The author has provided several suggested activities which teachers can easily implement in their own classrooms. Some of these include vocabulary (which is the root of reading comprehension and thinking) exercises. Another fringe benefit of using these suggested activities is the growth of the students' self image through having had these profitable vicarious experiences that can affect their social and academic efforts.

Gentile could very well have included with his recommendation of materials containing sports content, the suggestion of actually placing these materials in the classroom libraries for accessibility purposes. Additionally, mention might have been made of sustained silent free reading programs that could further enhance one's knowledge on a favorite topic while promoting the reading

habit, vocabulary growth, and laying the background for what the author calls stimulating critical thinking and reading.

Not only can sports material profit and stimulate the students, but teachers who are aware of sports information and terminology find themselves better received by their students because of this common bond. Students accept teachers as more human and are likely to better appreciate their instructional expertise. This form of communication leads to a more conducive atmosphere for learning and instructional purposes.

In summary, this reviewer has observed that teachers either do not, or are not given the freedom to capitalize on students' reading interests by choosing commercial materials or an array of informally collected materials to be used for instructional purposes. Gentile provides good rationale for utilizing sports related materials and themes to build and stimulate critical thinking. One would find it difficult to argue against applying students' high-priority interests to the initial efforts of increasing or facilitating critical thinking and reading skills to be transferred to other disciplines.

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## THE RELATIONSHIP OF WRITING TO ASPECTS OF INTELLIGENCE AND READING

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The relationship among the various language arts (listening, speaking, reading, writing) has generally been established as high and positive in recent research (Schieb, 1978). Some researchers (Stotsky, 1975 and Combs, 1977) have found this relationship to be causal. Thus, by improving proficiency in one language art there is often a simultaneous improvement in another language art. In this regard writing and reading appear to be the two language arts areas most often linked.

Applebee (1977) has found the high positive correlation among the various language skills to evolve from their mutual dependence upon syntactic maturity. He reported that reading and writing experiences tend to increase syntactic maturity and therefore improve each other.

Elementary children are generally introduced to writing after instruction in reading. Chomsky (1971) argues that children are developmentally prepared to write before they are ready to read and that their introduction to print should be through writing.

While the research concerning the relationship among the various language skills is well documented, the research concerning the relationship between the various language skills and intelligence is best described as inconclusive and controversial. Although reading and writing achievement has been found to be related to intelligence, intelligence alone will not determine how well a given student will read or write. Some researchers have found there to be a higher and more positive relationship between intelligence and writing than between intelligence and reading (Myklebust, 1973). This strong relationship is attributed to the high level of abstract thinking required for writing (Kirk and Elkins, 1975). The inefficiency of predicting a student's reading or writing performance based upon intelligence scores is greatest with elementary students.

At present, many school districts have abandoned or greatly reduced their use of I.Q. score.

Those school districts and institutions which do use I.Q. tests will most often use the Wechsler Intelligence Scale for Children-Revised (WISC-R) or the Stanford-Binet as their screening instrument. The WISC-R is the intelligence scale most often used in the UGA Reading Clinic and the instrument used in this study.

The WISC is an individually administered intelligence test which was published in 1949. It was standardized on a total of 2,200 children, all white, and the 1940 census was used to decide the distribution of the norming sample. The revised WISC was published in 1974 and normed on a representative sample of the 1970 U.S. Census. Minorities were used in the norming sample for the 1970 version of the test.

The WISC-R is designed to be used with children aged 6.0 years to 15 years 11 months.

The test is divided into two parts, a Verbal Scale and a Performance Scale, each of these parts has five required subtests and one subtest that can be used as an alternative or supplemented.

In general, researchers have found the WISC-R to be more reliable than group I.Q. test, but are undecided whether the Verbal, Performance or Full Scale scores are more closely related to reading expectancy. However, after reviewing much of the literature Harris and Sipay report that the general conclusion is that fewer mistakes will be made relying upon the Full Scale I.Q.

#### Purpose

The purpose of this study was to examine the relationship of measures of reading ability to various measures of intellectual and writing performance of the same subjects. All measures were obtained in the UGA Reading Clinic. Ten variables were selected to be compared in this particular study. The variables were chosen because reported association with reading performance in previous research.

#### Subjects

The subjects used in this study consisted of 79 students in grades 1 through 6 who were tested in the University of Georgia Reading Clinic during the 1980/81 school year. The primary reason for referral to this clinic is the presence of a reading problem in school. Several of the students tested, however, were not having reading problems and were tested to ascertain existing reading strengths and weaknesses. Thus, the sample is not as truncated as one might normally expect from a clinic population. All testing was done in a one day visit to the clinic by the subjects. The various tests administered at this time depended upon the students' diagnostic needs. Therefore, not all subjects were administered the same tests. This accounts for the range of 56 to 79 subjects on the various measures. Students below or above the grades mentioned above were occasionally tested in the clinic but not in sufficient numbers to justify their inclusion in the study.

All tests were administered by graduate students under the supervision of clinic personnel. Subjects usually worked with four different clinicians during their day of testing. A day in the clinic began at 8 a.m. and usually concluded at approximately 3:30 p.m. with a one hour break for lunch.

#### The Variables

The data for this study were collected after the subjects were scheduled and tested in the clinic. No special considerations during the subject's testing were made to facilitate the study. The following ten variables were examined:

1. Wechsler Intelligence Scale for Children-Revised—Verbal Scale
2. Wechsler Intelligence Scale for Children-Revised—Performance Scale

3. Wechsler Intelligence Scale for Children-Revised—Full Scale
4. An IRI-Instructional Level Score
5. Morris-McCall Spelling Score
6. The Woodcock Reading Test—Passage Comprehension Score
7. A Legibility Score
8. Number of T-Units in Writing Sample
9. Subjects Grade Level at the Time of Testing
10. Percent of Misspelled Words in the Clinic Writing Sample

#### Statistical Procedure

Pearson product-moment correlational coefficients were computed to determine the relationships between the ten measures collected in the clinic. The results of the analysis are presented in Table 1. Those subjects who are missing scores for no more than one of the variables are the only subjects whose scores are recorded in this table.

#### The Writing Sample

All students were shown a five by eight inch color painting of a rural farm community and read the following directions:

Look carefully at this picture and think about what it is showing or what the people are doing in the picture. Write at least three sentences about the picture.

The writing samples were scored on legibility and the number of t-units. The legibility scores were obtained by having 18 elementary teachers—3 for each of the grade levels in the study—rank the samples as either above average (1), average (2), or below average (3).

T-units, for the purpose of this study, are defined as any combinations of a subject noun phrase and a verb, including all object noun phrases and subordinate clauses.

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**Table 1**  
**CORRELATION COEFFICIENTS FOR ALL VARIABLES**

|                               | Grade  | Woodcock<br>Passage | Legibility | Percentage<br>Misspelled | T-Units | Morris-<br>McCall<br>Spelling | IRI   | WISC-R<br>Full Scale | WISC-R<br>Performance | WISC-R<br>Verbal |
|-------------------------------|--------|---------------------|------------|--------------------------|---------|-------------------------------|-------|----------------------|-----------------------|------------------|
| WISC-R<br>Verbal              | -.121* | .505*               | -.014      | -.094                    | .015    | .222*                         | .290* | .908*                | .555*                 | 1.000            |
| WISC-R<br>Performance         | .099   | .342*               | -.168      | -.001                    | .012    | .189                          | .270* | .850*                | 1.000                 |                  |
| WISC-R<br>Total               | -.029  | .482*               | -.086      | -.094                    | .004    | .233*                         | .313* | 1.000                |                       |                  |
| IRI                           | .642*  | .773*               | -.117      | -.310*                   | .351*   | .693*                         | 1.000 |                      |                       |                  |
| Morris-<br>McCall<br>Spelling | .690*  | .789*               | -.180      | -.343*                   | .132    | 1.000                         |       |                      |                       |                  |
| T-Units                       | .215   | .217                | -.197      | -.138                    | 1.000   |                               |       |                      |                       |                  |
| Percentage<br>Misspelled      | -.309* | -.375*              | .290*      | 1.000                    |         |                               |       |                      |                       |                  |
| Legibility                    | .001   | -.103               | 1.000      |                          |         |                               |       |                      |                       |                  |
| Woodcock<br>Passage           | .590*  | 1.000               |            |                          |         |                               |       |                      |                       |                  |
| Grade                         | 1.000  |                     |            |                          |         |                               |       |                      |                       |                  |

\*Significant at or beyond the .05 level

### AN INVESTIGATION OF THIRD GRADERS' LISTENING COMPREHENSION OF HUMOROUS CHILDREN'S LITERATURE

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This study was an investigation of third grade boys' and girls' listening comprehension of selected categories of humor present in children's literature. The listening comprehension of the nonhumorous and humorous story elements within humorous picture books was examined to determine if significant differences exist between third graders' comprehension of the two.

A review of the relevant research indicated that children are very interested in reading books that are humorous (Gates, 1930; Gunderson, 1957; Kirsch, Pehrsson, and Robinson, 1976; Peltola, 1963; Smith, 1962; Witty, Coomer, and McBean, 1946). It was also found that age and cognitive development make a difference in how a child responds to humorous stimuli. However, the research of sex differences was divided concerning the role sex has in comprehension of humor (McGhee, 1971; 1976a; Petry, 1978; Zigler, Levine, and Gould, 1967).

The limited research of humor's effect on learning and comprehension vary from humor having a facilitating effect to its having no effect (Curran, 1973; Davies and Apter, 1980; Ferris, 1970; Hauck and Thomas, 1972; Houdoumadi, 1977; Kaplan and Pascoe, 1977; Terry and Woods, 1975; Weinberg, 1973; Zillman and Williams, 1980). A positive relationship appears to exist between listening and reading comprehension, making it possible to draw conclusions about children's reading comprehension of the humorous and nonhumorous elements of picture books through their listening comprehension (Berger and Perfetti, 1977; Devine, 1978; Duker, 1961; Durrell, 1969; Elgart, 1978; Kirkham, 1977; Kreamer, 1973).

Therefore, oral presentation of humorous stimuli could allow for the social interaction that is important in much humorous material as well as differences in reading ability among the third graders. The review of the research suggested that picture books would be an appropriate context for measuring children's listening comprehension of humor in literature because

of their value in developing the oral language and reading competence of young children (Curtis, 1968; Dwyr, 1976; Rohwer and Matz, 1975).

The subjects for the study were 67 third grade students, 36 boys and 31 girls, from a rural county in northeast Georgia. The students were from heterogeneous classrooms and their reading levels were average and below average.

The materials used were 36 tape recorded humorous picture books. These humorous picture books were representative of nine categories of humor defined by Kappas (1965): exaggeration, surprise, slapstick, the absurd, human predicament, ridicule, defiance, violence, and verbal humor. Four books were selected for each of the nine categories; each selection was a book judged to be an appropriate representation of that category.

The instrument used in this study was a researcher-designed multiple choice test consisting of ten items, five measuring the listening comprehension of nonhumorous story elements and five measuring the listening comprehension of humorous story elements. Such a test was constructed for each of the 36 humorous picture books.

Data collection consisted of the following. During a five week period, groups of approximately 15 students at a time listened to the tape recorded humorous picture books. The sample of 36 picture books was randomly assigned to the four classes of third graders so that each class listened to nine picture books, one from each of the nine categories of humor. For each book, the multiple-choice test was administered with the researcher reading the test aloud to the students.

The following hypotheses, stated in the null and tested at the .05 level of significance, were concerned with third grader students' listening comprehension of humorous picture books. The categories of humor referred to in the hypotheses were those compiled and defined by Kappas (1965).

1. There will be no significant differences in the listening comprehension among the categories of humor.
2. There will be no significant differences between the listening comprehension of humorous and nonhumorous elements of the books.
3. There will be no significant differences between boys' and girls' listening comprehension

A repeated measure of analysis of variance with category

being the repeated factor was used to test Hypothesis One. If the analysis of variance resulted in a significant *F* value, Duncan's New Multiple Range Test (Kirk, 1968) was used to determine the sources of differences. An analysis of variance was also used to test Hypotheses Two and Three. The .05 level of significance was set to reject the null hypotheses.

### Findings

Hypotheses One stated that there would be no significant differences in third graders' listening comprehension among the categories of humor. Results of the analysis of variance were significant,  $F(8,520)=7.434, p < .05$ .

The analysis indicated that there was a significant difference in third graders' listening comprehension among the categories of humor. A Duncan's New Multiple Range Test was computed to compare the listening comprehension means of the nine categories of humor. Results indicated that the absurd category was comprehended to a significantly greater degree than the categories of violence, slapstick, ridicule, defiance, and verbal humor. Human predicament and surprise were comprehended to a significantly lesser degree. Since a number of the comparisons categories. Of the nine categories, violence was comprehended to a significantly lesser degree. Since a number of the comparisons revealed significant differences, Hypothesis One was rejected.

Hypotheses Two stated that there would be no significant differences between the listening comprehension of humorous and nonhumorous elements of the picture books.

The analysis indicated that there was a significant difference [ $F(1,65)=16.171, p < .05$ ] between third graders' listening comprehension of humorous and nonhumorous elements of the picture books. A comparison of the mean scores of third graders' listening comprehension of humorous story elements indicated that the nonhumorous story elements were comprehended to a significantly greater degree. As a result of the statistical analysis, Hypothesis Two was rejected.

Hypothesis Three stated that there would be no significant differences between boys' and girls' listening comprehension of the picture books.

The computations indicated that there were no significant differences; therefore, Hypothesis Three was not rejected.

### Discussion of the Findings

According to the incongruity theory upon which this investigation was based, humor arises from "disjointed, ill-suited pairings of ideas or situations that are divergent from habitual customs" (Keith-Spiegel, 1972, p. 110). Investigators advancing the incongruity theory surmise that incongruous relationships are always present in humor. Considering the incongruity theory from a developmental perspective, McGhee (1979) suggested that in the first seven or eight years the child goes through stages which correspond to particular cognitive acquisitions. Third graders should be within stage four, which is the most complex. During this stage, humor first begins to resemble the humor of adults. Children are now becoming aware of the ambiguity that may exist in the meanings of words. The eight year old child is less egocentric and more likely not to appreciate humor of a cruel or violent nature unless the act is recognized as accidental or unintentional.

The results of the third graders' comprehension of humorous picture books support the theory by McGhee (1979) that stage four children usually avoid humor of a cruel and violent nature, since books in the violence category were significantly less comprehended than the other eight categories. Perhaps this avoidance does not allow the student to concentrate on or attend to humorous stimuli; therefore, these stimuli are not comprehended as well as other types.

Although certain categories of humor are comprehended to a significantly greater degree, the nonhumorous story elements were comprehended to a significantly greater degree than the

humorous story elements. Terry and Woods (1975) also found similar results with third graders concerning humorous and nonhumorous testing materials. The researchers attempted to explain their findings in terms of the relationship between age and test anxiety and between humor and arousal. As a person advances through educational levels it is assumed that the importance of academic testing increases, therefore, so does test anxiety. Thus it is assumed that third graders are less tense than older children. Terry and Woods (1975) stated that perhaps these students were ever below the optimum level of tension for effective test performance. The researchers speculated that the combination of instructions deemphasizing the importance of the test and the humor manipulations would have further reduced students' level of test anxiety. If third graders are initially low in arousal, then further reduction would be revealed in lower performance. Perhaps a similar phenomena occurred in the present study. The children were very relaxed and appeared to feel that the data collection sessions were enjoyable. Apparently they looked forward to the researcher's visits and anticipated listening to the humorous stories with excitement. The researcher always emphasized at the beginning of each listening session that the students were to do their best, but that their performance would not affect their grades. While listening to many of the humorous story parts the children would laugh and "roll on the floor with glee." Although this relaxed atmosphere added to the children's enjoyment of the stories, it may not have facilitated the memory or understanding of humorous story elements.

Davies and Apter (1980) found no significant differences between scores obtained as a result of children viewing either a humorous or nonhumorous audiovisual slide-tape teaching program. The researchers stated that perhaps the type of humor used could be important and more research was needed. However, the present study revealed that among different types of humor, the nonhumorous story elements were significantly better comprehended. In past humor research, the comprehension of humorous and nonhumorous information was measured using different content.

Therefore, even though an attempt may have been made to select materials that were equal in difficulty and interest level, the question of whether the nonhumorous or humorous materials were inherently more or less difficult or interesting still exists. The present study employed humorous elements and nonhumorous elements from the same source, thereby decreasing the likelihood that the difficulty and interest level of the materials would affect the results. Because the nonhumorous story elements were significantly better comprehended in this study, it is evident that humorous information is more difficult for children to understand.

No sex differences were found in the comprehension of the categories of humor. Unfortunately, most of the studies which investigated sex differences have limited this investigation for the most part to the appreciation of humor. And those investigations which studied the comprehension of humor usually were not concerned with sex differences (McGhee, 1971; 1976b; Zigler, Levine, and Gould, 1966, 1967). The investigation done by Petry (1978) revealed that no sex differences existed in third and fifth graders' comprehension of humor in literature. Her findings are in agreement with the findings of the present study, which also found no sex differences. However, further research is needed since little investigation of sex differences in children's comprehension of humor has been done.

### Implications for Classroom Instruction

The present study has generated a number of implications for classroom instruction. Teachers should know that significant differences do exist among types of humor students comprehend. Therefore, the use of humorous materials should stress those types of humor children especially prefer and comprehend.



Other types of humor can be included; however, the teacher should make certain that students understand the humor by giving special attention to the more difficult types.

The present study revealed that no significant differences exist between third grade girls' and boys comprehension of different types of humor. Therefore, it should be possible to employ similar humorous materials with each group. Since other research has revealed conflicting results, teachers should observe characteristic patterns within their own classrooms and make judgment as to whether different types of humor are comprehended by boys and girls.

Humor has been found to have both facilitating effects on comprehension in some studies and no facilitating effects in others. Because the present investigation revealed that non-humorous story elements were better comprehended, the researcher feels that humor should be incorporated in the reading classroom with caution. Evidence from the present study does not support the idea that humor might facilitate comprehension. Therefore, perhaps teachers should build upon the children's appreciation of and interest in humorous stories to improve their comprehension of humorous story elements. Students could be allowed to share the humor through open discussions, oral reading, and role playing of humorous story parts. During teacher directed questioning, emphasis should be placed upon the understanding of why humorous story elements are perceived as funny and how these relate to the nonhumorous story elements. In addition to encouraging the comprehension of humor within reading materials, teachers could possibly use humor to gain the students' attention before important nonhumorous information is presented. Although research is needed concerning this idea, it may be speculated that humor could be used to facilitate learning and comprehension even when the humorous stimuli is not a part of the information being learned.

Perhaps the most important implication is that educators should not assume that children equally appreciate and understand all types of humor. If teachers want children to appreciate and understand all categories of humor then it should be recognized that some categories will require more instruction and exposure than others.

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# READING COURSES FOR TEACHERS IN THE DISCIPLINES: ON THE INCORPORATION OF ISSUES FROM CRITICAL CURRICULUM THEORY

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"The tendency of educational development to proceed by reaction from one thing to another, to adopt for one year, or for a term of seven years, this or that new study or method of teaching, and then as abruptly to swing over to some new educational gospel; is a result which would be impossible if teachers were adequately moved by their own independent intelligence. The willingness of teachers, especially of those occupying administrative positions, to become submerged in the routine detail of their callings, to expend the bulk of their energy upon forms and rules and regulations, and reports and percentages, is another evidence of the absence of intellectual vitality. If teachers were possessed by the spirit of an abiding student of education this spirit would find some way of breaking through the mesh and coil of circumstance and would find expression for itself" (Dewey 1904, p. 321).

Dewey sets forth a tremendous challenge which is just as important today as it was eighty years ago. In effect, he argues that although educators are necessarily immersed in the detailed operations of their educational roles, they should maintain a foundationally questioning posture and see beyond immediate necessity as "students of education" in a larger sense. The purpose of this paper is to present one method which has been successful in helping education students enrolled in "Reading in the Content Areas" to develop a broader sense of "students of education"; and, at the same time, facilitate the processing of specific information about the incorporation of reading strategies into the teaching of various disciplines. First, the difficulties involved in maintaining this larger perspective will be discussed; second, the issues and materials used to foster a broader perspective will be detailed; and third, positive aspects of the implementation procedures will be reported.

## Difficulties in Developing Overall Perspectives

How can education students in content reading courses be encouraged to grow as true "students of education"? A central problem involved in answering this question revolves around the concept of paradigm as developed by Thomas Kuhn in *The Structure of Scientific Revolutions*. A paradigm, in Kuhn's terms is more than a similarity in methodological procedure. Rather, it is a natural convergence of individuals with similar fundamental ideologies. He states that although there are "seminole" thinkers who actually create fundamentally new perspectives, generally, individual researchers and scientists accept as given a particular perspective and proceed with what he labels "normal" science. In "normal" science the focus is on clarification and refinement of previously accepted perspectives.

The basic idea behind Kuhn's conception of paradigm is applicable to education in general, the area of reading, and specifically reading in the disciplines. As Dewey states, educators do tend to "proceed by reaction from one thing to another" in groups. This sense of group identity not only exists but is also transmitted to pre-service and in-service teachers by teacher educators through course work such as "Reading in the Content Areas", and, in turn our students transmit this propensity for the acceptance of givens to their students in elementary schools and high schools. Greene states that because teachers are "often submerged in the bureaucracies for which they work, they simply accede to what is taken for granted. Identifying themselves as spokespersons for—or representatives of—the system is its local manifestation, they avoid interrogation and critique. They transmit, often tacitly, benign or neutral versions of the social reality. They may, deliberately or not, adapt these

to accommodate to what they perceive to be the class origins or the capacities of their students, but, whether they are moving those young people towards assembly lines or administrative offices, they are likely to present the world around as given, probably unchangeable and predefined" (p. 56).

The "givens" Greene refers to here are those which define the limits of particular paradigms. Popkewitz (1980) describes the existence of three fundamentally different paradigms in education: empirical/analytical, symbolic and critical. Briefly, the empirical/analytical paradigm is modeled after physical science. There is a reliance on the replicable measure of observable data, objectivity and the use of "scientific method". The "symbolic" paradigm utilizes a view borrowed from psychology, sociology, and anthropology. From this perspective, case studies and in-depth ethnographic procedures are used to uncover the meanings of language usage, societal roles and individual or group interrelationships. In the critical paradigm, analysis of the political and ideological underpinnings of education are examined in an effort to expose the latent function of schooling as situated within the nexus of a modern technological society. Particular attention is given to the unequal distribution of power and wealth in society and the role of schools in maintaining the existing hierarchical framework.

An examination of popular contemporary reading periodicals, such as *The Reading Research Quarterly*, *The Journal of Reading*, *The Reading Teacher*, *The Journal of Reading Behavior*, would clearly indicate the empirical/analytical paradigm is the predominate reading research paradigm. In an examination of contemporary reading texts, Beyer and Rouse (1981) found a similar reliance on empirical/analytical perspective as the foundation and support for reading methods texts.

This similarity in foundational perspective throughout a field such as "reading" is, at least in part, responsible for the ease with which educators, in Dewey's words, "swing over to some new educational gospel." The result can be teachers who are tailored as dispensers of pre-packaged educational doctrine rather than "students of education" who are capable of bringing their own intellect to bear on education as a means of emancipation.

Given the need for a broad perspective and Dewey's differentiation between teacher training versus teacher education, the value of presenting diverse alternatives to popular procedures becomes clear.

## Issues And Materials For An Alternative Perspective

In a field such as reading which focuses in part on various teaching styles, techniques, and strategies, there is a natural inclination to conceive of teaching as a technical, quantifiable, and ameliorative activity. Given the continual demands placed upon classroom teachers to respond to and interact with students and curricula on a variety of levels, this emphasis on amelioration and technique is understandable. In the area of reading instruction, the task of the reading teacher is often thought to consist of applying the proper series of "treatments" or "interventions" to enable the student to improve his or her reading performance, as measured through observable behaviors. This orientation has the effect of regarding reading as primarily an apolitical enterprise to be taught by specialists who have mastered the requisite skills, techniques and materials.

Within the last decade or two there have been developments in curriculum theory which directly challenge this apolitical orientation. Rather than treating schools as neutral institutions, to be understood via the application of specific input and output measures, a large body of recent scholarship in curriculum inquiry has sought to explicate the social, political, and ideological role schools serve in contemporary society. In this area, answers are sought to questions such as: whose knowledge gets taught in schools; what are the hidden and overt meanings which become attached to school practice; how are these related to the continued dominance of certain social classes at the expense



of other, less powerful groups; and so on. Questions like these have spawned an interest in the ways in which schools serve as agents of economic and cultural reproduction.

For example, Bowles and Gintis (1976) argue that the hidden curriculum of schools corresponds to the dispositional and psychological needs of a capitalist labor market. Young (1971) urges us to consider how forms of knowledge and their dissemination may be related to the unequal distribution of goods and power in society. In rejecting correspondence theories of ideological domination, Apple (1976) argues that the hegemonic control of cultural practices and institutions requires a less mechanistic, more mediated analysis. These and other writers in education have greatly extended our understanding of the ideological and political purposes of educational institutions.

In an effort to convey this critical view of existing practice, three articles have been particularly helpful in getting students enrolled in "Reading in the Content Areas" to see beyond the mastery of specific techniques to the positioning of these ideas within a larger ideological and political perspective. First, Maxine Green's "The Matter of Mystification: Teacher Education in Unquiet Times" from her book *Landscapes of Learning* (Teachers College Press, 1978) articulates the pressing need for educators at all levels to challenge the apparent "givens" within which they work and to move toward more "authentic" ways of relating within the educational context. She presents a very strong argument for the fact that many of our world conceptions are formed in a state of mystification. As a result, a large part of our energies as educators are focused on "surface" realities. In the process, attention is distracted from the real purposes and implications underlying our activities.

An example from contemporary practices in high schools may help to clarify the concept of mystification and its relationship to reading. Some high school teachers have responded to a decline in the reading ability of their students by decreasing the amount and difficulty of reading assignments, and by replacing reading as the major learning medium, with lecture and audio visual methods.

On the surface, this change may have helped some students master specific aspects of isolated content. In the process, however, the larger issue of teaching students "how to learn" and tapping the vast horizons of incidental learning through individual wide reading has lost ground. In effect, the focus on mastering specific content material in isolation has, in some ways, masked a deeper problem of general access to information and literature. On another level, teachers who accept the limited reading performance of their students and resort to coping strategies as in this example, actually help perpetuate societal inequalities by limiting general social mobility. (For a detailed analysis of this concept, see Apple, 1979.)

Second, two chapters from Michael Apples' *Ideology and Curriculum* (Routledge and Kegan Paul, 1979) are particularly useful in helping students see the political origins and power structure underlying the development of schools and the ideological impact of the activities in which they are involved. In "Curricular History and Social Control" (p. 61-81) Apple examines the influence of powerful groups in society on the formation and direction of public education. In his chapter titled "Commonsense Categories and the Politics of Labeling" (p. 123-153), Apple lays out some of the adverse consequences in the over use of labeling and categorization procedures. Beyond its value in opening student minds to an alternative perspective, this chapter is of special relevance to the area of reading with its use of standardized measures of performance, ability grouping and special programs for "disabled readers."

A third article which is especially helpful is John Bartholomew's "Schooling Teachers: The Myth of the Liberal College" (p.

114-123) from *Explorations in the Politics of School Knowledge*, (Nafferton, 1976). Bartholomew argues that although college and university educators teach liberal ideas, they do so utilizing a conservative framework in the process. The result is a situation in which students are forced to separate their mental activity from the actual practices in which they are involved. Just as Dewey distinguished "internal" and "external" attention for elementary students, Bartholomew argues that education students are required to separate theory (that which is talked about in education classes) from practice (those things that professors actually do). The knowledge of this separation for students can mean an increased awareness of the limitation of their educational preparation and the propensity they are likely to have for practicing, as teachers, not what they have talked about theoretically but the conservatism which they have practiced all along.

### Implementation

The perspectives referred to above can be incorporated into courses for teachers of reading in the disciplines by simply using these articles as examples of "content" in giving demonstrations of content reading techniques. When this is done, not only are alternative perspectives presented but there are the additional pedagogical benefits of increasing teacher empathy for future students, providing concrete examples for the demonstration of important reading skills, and helping students understand the utility of specific reading techniques.

A big problem for pre-service teachers is understanding the relevance of abstract educational content. In short, because they have no "teaching" experience, it is often difficult for them to understand the complexities of teaching students with backgrounds which are diverse from their own. In-service teachers also can lose sight of the difficulty of the material they work with because of their continual contact with it. In both cases, some teachers have little empathy for students who are having a difficult time with their content material. Because the above mentioned articles are written for curriculum theorists, they are written with a heavy semantic load and address issues with terminology which is generally unfamiliar to individuals without a background in curriculum theory. The result is that for a majority of students, these articles are written close to their frustration levels and in reading them, they experience feelings which are similar to those many of their own students will face.

Pedagogically, there is little question about the importance of concrete examples. And, the above mentioned articles have proven very useful in demonstrating and giving students practice in content related reading topics such as the use of readability formulas, SW3R, differences between expository and narrative text, etc.

A particularly useful aspect of using these articles is in helping teachers see the utility of important reading techniques. By using these articles not only do students get contact with diverse issues, a sense of empathy for future students and concrete experience, but furthermore, they can experience the benefits of specific reading techniques themselves. For example, in teaching the importance of previewing important vocabulary in a directed reading activity, half of the class might read a section of Maxine Green's, "The Matter of Mystification: Teacher Education in Unquiet Times" without discussing the definitions of key terms. In a post-reading comparison of the understanding of key concept, students who had the advantage of an introduction to important vocabulary have invariably demonstrated a deeper understanding of what they read. It seems likely that individuals who experience the positive effect of techniques such as these as learners will be

influenced to use them when helping their own students.

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#### THE EFFECT OF COGNITIVE STYLE ON READING AND WRITING IN SCIENCE MATERIALS

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In recent years language researchers have given increasing attention to exploring a number of variables associated with the reading and writing processes. In particular, Bruce, Collins, Rubin, & Genter (1978); Flower (1979); and Flower & Hayes (1977) have examined certain cognitive variables associated with the writing process, attempting in their studies to characterize cognitional relations between reading and writing. Atwell (1980) and Shanklin (1981) have gone so far as to assert that the same cognitive variables underlie both the reading and writing processes. The study reported here attempted to shed light upon this area of inquiry by examining the effect of one cognitive dimension upon the discourse processing operations involved in reading and writing, that of cognitive style.

Santostefano, Rutledge, & Randall (1965) characterize cognitive style as . . . "When perceiving, an individual's cognition is active, not passive, selecting, sorting and organizing information according to particular system principles which are influenced by motivational and personality factors" (p. 58). One inference that may be drawn from the concept of cognitive style is that the manner in which individuals process discourse in reading and writing will necessarily be influenced by their own stylistic patterns of cognition.

Field dependence-independence is one dimension of cognitive style that may influence how individuals process discourse. It refers to the characteristic modes of functioning which individual demonstrate in their cognitive activities. Witkin, Moore, Goodenough, & Cox (1977) described field-dependent persons as individuals who have difficulty with problems whose solutions depend on taking some critical element out of the context in which it is presented and restructuring it in some alternative way. Field-dependent persons tend to use a field as they find it, to make less use of surrounding information in processing a problem, and to have more difficulty in analyzing it. They experience separate parts of a perceptual field as fused; i.e.,

they are unable to differentiate parts from the total organization. On the other hand, field-independent persons are able to experience elements of a total organization as separate entities and are more likely to depart from the context of a given problem to generate a solution in an analytical, problem-solving fashion.

Of particular relevance to the present study is previous research carried out by Kagan (1980) and Spiro and Tirre (1979) which examined the correspondence between field dependence-independence and reading and writing. In a study using community college students, Kagan (1980) found that field dependence-independence correlated significantly with syntactic complexity. Specifically, she found that field-independent subjects were better able to embed coordinations and clauses within sentences and wrote significantly longer sentences than their field-dependent counterparts. Kagan concluded that field dependence-independence was clearly associated with the ability to manipulate language effectively.

Spiro & Tirre (1979), again using college students, examined the relation between field dependence-independence and subjects' ability to recall information from text. They found that field-independent subjects were better able to recall text by selectively applying relevant schemata to the text passages. Spiro and Tirre concluded that field dependence-independence is associated with the ability to capitalize on prior knowledge to increase recall of information, particularly when required to separate certain aspects of the text from the total context.

Birnbaum (1980) suggested the possibility that cognitive style is also related to differences observed in the rate of processing and reporting information in a study examining the composing and reading behaviors of fourth and seventh grade students. Therefore, the present study was undertaken to verify this suggestion and to extend the findings of Kagan (1980) and Spiro and Tirre (1979) to public school students. The major guiding question of this study was: To what extent can the character of a person's discourse processing operations be predicted by cognitive style? More specifically, the following research questions were posed:

- 1) To what extent does the measured level of field dependence-independence predict the syntactic complexity of written discourse?
- 2) To what extent does the measured level of field dependence-independence predict readers' engagement with text as reflected by the quality of the semantic content of their written recall of textual materials?

#### METHOD

##### Subjects

Subjects were 70 eighth-grade students from a school district in the Southeastern United States. Drawn from a predominantly middle socioeconomic population, the sample included approximately an equal number of blacks/whites and male/females. All subjects were considered to be good readers (70% or better national percentile) for their grade placement according to results of the *California Achievement Test*, Form 17C (1977).

##### Instruments

Field dependence-independence was measured by the *Group Embedded Figures Test* (GEFT). The GEFT (Oltman, Raskin, and Witkin, 1971) is a timed, group administered test consisting of 18 items which require test-takers to disembed figures from a field. The GEFT classifies individuals as field-independent or field-dependent according to the total number of correct responses.

To obtain samples of subjects' writing with science materials, O'Donnell and Hunt's *Aluminum* paragraph (Hunt, 1970) and Smith's *Bee* paragraph (Smith, 1972-73) were used. These passages were used to minimize syntactic variance attributable to content. Each paragraph consisted of a number of short, choppy kernel sentences. Subjects were directed to rewrite



the paragraphs, making it better and leaving out no information. Words could be added or omitted at the writer's discretion.

To obtain samples of subjects' recall, the eighth grade prototypes of the *Aluminum* and *Bee* paragraphs (Smith, 1971; 1972) were used. These paragraphs were written according to the data derived from Hunt (1970) and were typical of the syntactic characteristics exhibited by average eighth-graders. Thus, the difficulty level of these paragraphs insured that reading ability was not a factor in measuring recall. Subjects were directed to read the paragraphs and try to remember everything they could about it. Then they were asked to write down all they recalled, not worrying about spelling, punctuation, or grammar.

### Procedure

Subjects were administered the GEFT to determine field dependence-independence. Those scoring between 1 and 9 were classified as field-dependent; those scoring between 10 and 18 were classified as field-independent. Scores ranged from 1 to 18. Two groups of 35 subjects resulted from the GEFT administration.

Both field-dependent and field-independent subjects were randomly assigned to one of two groups. One group was given the *Aluminum* passage to reconstruct in writing followed by the *Bee* passage to read and recall. In order to counterbalance for passage effect, the second group was given the *Bee* passage to reconstruct in writing followed by the *Aluminum* passage to read and recall. Thus, the first group consisted of 17 field-independent subjects and 18 field-dependent subjects. The second group consisted of 18 field-independent and 17 field-dependent subjects. Total data collection took approximately 60 minutes in two sessions.

Syntactic complexity of subjects' writing was determined by using the *Syntactic Density Score* (SDS) developed by Golub and Kidder (1974). This called for analyzing the texts for the presence of ten sentence variables, tabulating their frequency of occurrence, and computing them according to a weighted formula.

In order to provide a model against which to compare subjects' recall protocols, a template text base was prepared for each passage according to procedures detailed by Turner & Greene (1977). Each protocol text base was scored by comparing it to its template text base and examining it for the degree of similarity of recalls. Propositions of each protocol text base were then identified as either text reproductions, which repeated propositions in the template text base, or reader-based inferences, which were thematically related to the topic but possessing no other connection to it. Frequency of both text reproductions and reader-based inferences were tabulated.

### Data Analysis

Data obtained were first analyzed using *t*-tests to examine differences between field-dependent and field-independent subjects in their performance on the two passages. No significant differences were found in the performance of field-independent subjects in syntactic complexity, text reproductions, and reader-based inferences on either the *Aluminum* or *Bee* passages. On the other hand, significant differences were found in the performance of field-dependent subjects on syntactic complexity only ( $t(17)=2.32, p < .05$ ) for the passages.

Statistically significant differences were also found between field-independent and field-dependent subjects on syntactic complexity across groups. Field-independent subjects produced syntactically more complex reconstructions of both the *Aluminum* and *Bee* passages ( $t(17)=3.46, p < .01$ ;  $t(17)=2.26, p < .05$ ) than their field-dependent counterparts.

Data were then analyzed using a stepwise regression analysis. Results of this analysis revealed that performance on the GEFT was significantly related to syntactic complexity ( $F(1/68)=$

15.04,  $p < .001$ ), accounting for 18% of variance. Zero-order correlations, showed significant correlations between GEFT score and total number of words ( $r=.37, p < .01$ ), total number of *t*-units ( $r=.45, p < .0001$ ), main clause length ( $r=.33, p < .01$ ), and number of unbound modifiers ( $r=.31, p < .01$ ). Performance on the CAT also was related to syntactic complexity ( $F(2,67)=9.79, p < .001$ ), accounting for an additional 5% of the variance. Thus, the best predictor of performance in manipulating language structures was found to be the GEFT score. A significant correlation was also found between the GEFT score and number of text reproductions indicating that field-independent subjects recalled more text propositions than field-dependent subjects ( $r=.28, p < .05$ ).

### DISCUSSION

The most significant finding resulting from this study is that field-independent individuals have an advantage over field-dependent individuals in their ability to deal with the structures of language. The ability to utilize subordinate language structures may be analogous to disassociating a figure from a complex field.

The findings of this study with eighth grade students show some similarity to the findings of Kagan (1980) with college level students. Field-independent subjects, regardless of grade level, seem better able to write significantly longer and syntactically more complex sentences than their field-dependent counterparts. However, while Kagan found that field-independent college students generated more clauses per *T*-unit, longer subordinate clauses, and a higher frequency of *T*-unit coordinations (use of *and* within the *T*-unit), field-independent eighth grade field-independent subjects showed more facility with unbound modifiers, while Kagan's college subjects did not. It may well be that college level field-dependent students have achieved sufficient facility with unbound modifiers through maturation to diminish such differences. This possibility could be tested through a training study using younger field-dependent subjects.

No differences were found in field independent subjects' performance on syntactic complexity across the two passages. However, differences were found with field-dependent subjects. This differential performance could be explained by assuming that field-dependent individuals do not process and restructure text as readily as field-dependent individuals. A more plausible explanation is that field-dependent individuals will process text differently depending upon the amount of prior knowledge they bring to the restructuring situation. Field-dependent subjects, apparently possessing more prior knowledge about bees than aluminum, are more readily able to utilize that knowledge in developing more complex syntactic structures. This concurs with the evidence supplied by Spiro & Tirre (1979) that field-dependent subjects less readily apply prior knowledge to textual situations.

This evidence also applies to the finding of this study that field-dependent individuals were able to produce more text-based propositions in recall. Additionally, such individuals, by definition, are more able to disassociate propositions from the total context for recall purposes than are field-dependent subjects.

Finally, performance on the GEFT seems to be a much better predictor of performance in manipulating language structures than either reading achievement or language achievement as measured by standardized tests. The data suggest that is not sufficient to examine reading or language achievement scores and conjecture about quality of writing performance. Field dependence-independence is a more reliable predictor of writing maturity.

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### READING COMPREHENSION OF STUDENTS ON POSTCLOZE PROCEDURES FOR TEXTBOOKS IN FIVE DISCIPLINES

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Funded by Title III (Strengthening Developing Institutions Program), our Instructional System for Individual Differences has four basic subsystems. One of the subsystems relates primarily to developmental studies: (a) assessment in admissions, (b) developmental reading, (c) developmental English, (d) mathematics placement, and (e) oral communication.

The developmental reading component in our model has struggled through many difficulties in its attempt to identify a successful reading program for high risk students. In the first year of the Title III program, there was the concern for acquiring outstanding reading personnel to teach developmental reading and do research on developmental hypotheses. In the second year, much faculty effort, time, and administration focused on identifying the strengths and weaknesses in reading

of all freshmen (c 1400) and then to urge faculty advisors and university administrative personnel to place students in the developmental reading courses. There was a widespread fear of testing, a fear of knowing the low abilities of students and a fear that testing would turn students of Eastern Kentucky to other universities to avoid the assessment program at Morehead State University (MSU). There was the stigma of having to take developmental reading "because you are a poor reader." In this third year (1981-82) of the grant, the identification and criterion problem is still with us. We continue to look for the reliable and valid way to identify the student with developmental lag in reading. When we identify students for developmental reading classes, we are still having great difficulty with students and advisors in persuading students, who need the individualized program in reading, to take the course and stay in the course for at least one semester.

Currently, the Reading Center administers the Reading Progress Scale (RPS) (Carver, 1970) to every freshman entering MSU at registration time. In 1981, a few more than 400 students failed the Reading Progress Scale (RPS). The failure rate was estimated at 29 percent of the freshman class. Every advisor was urged to be firm and rigorously counsel students to take developmental reading if they had ACT composite standard scores of 14 or below and high school GPA's below 3.2, or had failed the Reading Progress Scale, or had earned a 2.3 or lower grade point average in high school. Although 500 or more freshmen (1981) students should have taken developmental reading, only 227 of the 1420 students enrolled in Developmental Reading. Based on freshman entrance characteristics and first semester performance, we shall test a number of hypotheses relating to academic performance and retention between those students failing the RPS who took the Development Reading course and those who did not enroll in the course.

When we examined pretest and posttest scores of students, in developmental reading on the California Achievement Test (CAT), there was no significant difference between pretest and posttest raw scores on vocabulary or on comprehension. This result appears to be consistent with prior research in developmental studies, namely, that the CAT is not able to identify significant differences in the pretest-posttest raw scores of freshman students in developmental reading.

Two weeks before the end of the fall semester (1981), we presented five postcloze tests with 60 elisions in each test for the disciplines of English, mathematics, American history, sociology, and psychology. We obtained the basic college text in each of the beginning courses of the five disciplines and determined readability levels for each text computed by both the Fry and the Dale-Long formulas. With the exception of the mathematics textbook (ninth grade level), all textbooks had readability levels of college textbooks.

The postcloze test procedures were administered to all the students in the developmental reading classes in this manner: (a) From the list of 227 freshman students in Developmental Reading, students' names were randomly placed into one of five categories: English, mathematics, American history, sociology, or psychology. (b) Each student was presented a sealed envelope with his or her name and social security number on the envelope. Clipped to the envelope was a xerox copy of a page from a textbook from which the cloze test in each envelope was taken. (c) Each student was asked to fill in each blank (60 elisions) with the word which was missing or the most appropriate word. (d) When each student finished reading the criterion text in his category, he or she was to raise a hand, and the passage would be picked up by the examiner. The student would open the envelope and complete the postcloze test without time restraints.

The table listed below contains the number of students in each category, the average postcloze score, the highest and lowest postcloze score, and the range of scores in each category.



Table 1

**POSTCLOZE TEST MEAN SCORES AND RANGE OF  
SCORES IN EACH OF FIVE CATEGORIES  
OF DISCIPLINES**

| Category    | N   | Mean<br>Score | Standard<br>Deviation | High<br>Score | Low<br>Score | Range |
|-------------|-----|---------------|-----------------------|---------------|--------------|-------|
| English     | 44  | 25.1          | 7.7                   | 40            | 4            | 36    |
| History     | 44  | 22.8          | 10.4                  | 48            | 3            | 45    |
| Mathematics | 44  | 23.7          | 8.1                   | 39            | 10           | 29    |
| Psychology  | 44  | 27.0          | 5.9                   | 39            | 9            | 30    |
| Sociology   | 44  | 33.9          | 9.3                   | 53            | 13           | 40    |
| Total       | 220 | 26.5          |                       | 53            | 3            | 50    |

Three classrooms in beginning courses in each of four disciplines were selected. (We were unable to obtain test data in the Sociology classes in the Fall of 1981.) No attempt was made to obtain random samples of classrooms because it was difficult to obtain permission for testing so late in the semester. Students were asked to open their textbooks to the criterion passage and to read it. When students completed the reading, they were to close their textbooks and complete the cloze test for the criterion passage. No student who had taken a postcloze test in Developmental Reading was permitted to be tested again. Table 2 contains the data from responses of students in each of four disciplines.

Table 2

**MEANS AND RANGE SCORES OF RESPONSES BY  
FRESHMAN STUDENTS ON POSTCLOZE TESTS  
IN FOUR DISCIPLINES**

| Category    | N   | Mean<br>Score | High<br>Score | Low<br>Score | Range |
|-------------|-----|---------------|---------------|--------------|-------|
| English     | 92  | 31.5          | 51            | 16           | 35    |
| History     | 90  | 30.3          | 49            | 6            | 43    |
| Mathematics | 105 | 33.5          | 54            | 15           | 39    |
| Psychology  | 115 | 32.3          | 47            | 12           | 35    |

Postcloze tests are administered after the reading of a passage from which the deletions are drawn; postcloze tests are similar to achievements tests. Pretest cloze procedures depend upon general background knowledge of the subject and upon his ability to utilize the redundancy inherent in language. They correlate relatively high (in the 70's) with standardized tests of intelligence (Taylor, 1957); Bormuth (1968) reported correlations in the 80s.

The postcloze test procedure, which was used in this study, provides a level of functioning specific to reading material in a particular classroom; therefore, it offers opportunities to measure reading abilities adjusted to functional criteria. In many developmental studies programs, there is a greater concern for remedial reading than for developmental reading. Remedial reading is more focused on improving general abilities in reading and correcting weaknesses in vocabulary and word attack skills. Developmental reading is aimed at improving reading abilities but is more directly concerned about the student's ability to comprehend concepts and meaning of words in specific courses and disciplines. Above all, in developmental reading there is the primary concern to protect the self concept of each student with any kind of deficit or disability. For college students it

means making a student feel challenged to succeed with college materials without feeling that he is in fourth grade, or sixth grade, or eighth grade reading. Students in developmental studies must not feel relegated to an earlier stage of education.

Responses by students in Developmental Reading in this study appear to be much lower than responses of the general student body taking courses in the disciplines. Students in Developmental Reading classes had significantly lower average scores on postcloze tests in four disciplines (English, American history, mathematics, and psychology) than students in general education courses in the disciplines.

When the arbitrary criterion of 50 percent of the total elisions was applied, four of the five groups in Developmental Reading fell below the criterion measure. In the general education courses, however, all of the four groups tested scored at or above the 50 percent criterion.

The relatively large variance of the postcloze scores in the Developmental Reading classes raises the serious question of the ability of a number of freshmen students to read, with comprehension, the basic texts in the courses of five disciplines. After one semester of Developmental Reading, a large number of students are not ready to do college work.

Although the students with extremely low reading scores are permitted to register for developmental studies, it is highly improbable that students with such reading deficits can master the curriculum reading material in a reasonable amount of time. If students with extremely low ACT scores in English and on reading measures are successful in the freshman year, it is due to some personality or cognitive factors which have not been identified in reading research. It is gratifying, but it is unique. The serious question for administration of our Title III program is what criterion measure(s) will we use to predict that students can make up their developmental lag in a semester or two and complete a four-year degree.

We are generating hypotheses, here, not testing them. In the Spring of 1982, we hope to look at pre and postcloze tests, general ability measures, Degree of Power in Reading, attitudinal measures, and personality profiles.

**USING A THEMATIC ORGANIZER TO DEVELOP  
CONCEPTUAL COMPREHENSION IN FOURTH, FIFTH,  
AND SIXTH GRADE REMEDIAL READERS**

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Students with reading difficulties often are unable to comprehend major concepts of content materials. Comprehension problems may be the result of the instructional strategy, limited scope of comprehension questions asked by the teacher (Guszk, 1972), or abstract concepts which are not defined in the text (e.g., Pearson & Johnson, 1978). An inspection of social studies texts by these researchers revealed that thematic concepts were often implied or ill-defined.

Schema theorists suggest that providing and extending background experiences and knowledge prior to reading may enhance the readers' comprehension of difficult and/or abstract concepts. Several studies have verified that a statement of theme presented prior to reading increases comprehension for the passage (Bransford & Johnson, 1972; Dooling & Lachman, 1971). Pearson, Hansen and Gordon (1979) found that developing a schema for the content of a text resulted in significantly

better performance on textually explicit and implicit questions. Omanson, Warren and Trabasso (1978) also found in their work with five and eight year olds that children are able to make inferences but often lack prior knowledge to draw inferences as related to a selected situation or content of a passage.

Many forms of prereading activities or pre-organizers have been used to develop prior knowledge to aid reading comprehension. Advance organizers (Ausubel, 1960, 1968), structured outlines (Glynn & DiVesta, 1977), structured overviews (Barron, 1969) and thematic titles (Adams, 1977; Adams & Collins, 1977; Bransford & Johnson, 1972; Dowling & Lachman, 1971) are some of the strategies reported to increase reading comprehension.

The role of prior knowledge seems to be essential when the reader is required to interpret implied and/or difficult concepts. For comprehension to occur, the reader must be able to integrate new information into the knowledge already possessed. Therefore it is presupposed that the instructional strategy should extend the students' prior knowledge to develop a "cognitive readiness" for the new information presented in the text.

The purpose of this study was to investigate whether an instructional strategy could aid poor readers' comprehension of an implied concept by making it more explicit. The instructional strategy incorporated the use of a reading guide or a thematic organizer, which the student read prior to and during the reading of the text. The thematic organizer was used to expand the readers' prior knowledge by defining the implied thematic concept of a social studies passage and presenting examples of that concept which were thought to be relevant to the reader. In a study with a group of average readers, Alvarez (1980) found that the use of a thematic organizer aided literal and inferential comprehension of a thematic concept in a social studies passage.

The researchers attempted to answer several questions in this study. Would the provision of background information on the implied thematic concept enhance the ability of poor comprehenders to discuss and/or explain that concept after reading a social studies passage? Specifically: (a) Would poor comprehenders benefit from this instructional strategy as assessed by their ability to retell the literal and implied information presented by the author? (b) Would poor comprehenders increase their ability to retell the literal and implied information presented by the author? (b) Would poor comprehenders increase their ability to answer literal and inferred questions on the passage? (c) Could students use the information presented in the thematic organizer to aid their ability to discuss and elaborate upon the literal and implied information of the text?

## METHOD

### Subjects

The sample for this study was twenty-four fourth, fifth, and sixth grade students who were referred to the Child Study Center of the Kennedy Research Center of Peabody College of Vanderbilt University. These students had been classified as "below average" readers by their referring classroom teachers. The Child Study Center provides multidisciplinary diagnostic and intervention programs. An after school remedial reading tutorial program is one function of the Child Study Center. School-age students are referred to the remedial reading program by parents, classroom and/or resource teachers and psychologists in the community.

### Procedure

At the beginning of the tutoring program all children were tested on the *Gilmore Oral Reading Test*, Form C, 1968. All students were stratified according to grade level and performance on the Gilmore reading comprehension subtest and then randomly assigned with replacement to either the experimental

or comparison group. There were approximately the same number of girls and boys in each group. Students were tutored in either a one-to-one or one-to-two setting. The nature of these pairings was equivalent across the experimental and comparison groups.

The eighteen tutors for the study were pre-service teachers enrolled in an advanced undergraduate reading methods course entitled "Remedial Reading and Practicum." All tutors completed the course before the study was implemented. The tutors were randomly assigned with replacement to the experimental or comparison group. Neither the students nor the tutors were aware of the nature of their group placement.

A script for the teaching procedure was provided for each group of tutors. Each set of tutors were taught to follow the script during two training sessions. During the interventions, tutors were observed (through one-way mirrors) by external evaluators who found little or no deviation from the script, with a reliability estimate of .98. A three week period was used for this study. There were two remedial sessions each week with a two day delay evaluation following the sixth session. The data collected on the sixth session and the two day delay were analyzed for this study. All students were pretested on four concepts including the concept presented in the sixth session, four weeks prior to the commencement of this study. No student was able to define or discuss any of these concepts.

The tutors in each group followed a different set of procedures. The tutors in the comparison group were given a set of prereading questions and the passage which included its title. The prereading questions required the students to discuss literal information presented in the text and predict the meaning of the title and/or implied thematic concept of the passage. Students were asked to read the passage to answer these prereading questions or confirm their predictions.

In the experimental group, the tutors utilized the thematic organizer and the passage with the title included. The students were asked to read the thematic organizer prior to reading the passage, write their prediction statements and respond to the statements during or after reading the passage. They were told that they could refer back to the thematic organizer at any time as they read.

Following the reading all students were asked to retell what they read and answer ten questions (5 literal and 5 inferential). All responses were tape recorded and then typed as verbatim scripts by the tutors. For the comparison group, the time each student used to read the passage was recorded. Time for reading the thematic organizer and passage was recorded for each student in the experimental group.

During the study, several variables were held constant. Each tutor of both groups received equal conference time with the supervisor. All tutoring sessions were held under the same conditions (e.g., number and time of sessions, size of tutoring rooms, amount of observation time).

### Materials

A set of social studies passages were collected from fourth and fifth grade textbooks. All passages contained an implied thematic concept which was judged to be a factor influencing the difficulty level of the passage. Six expository passages were randomly selected from this set to be used as instructional materials (see references). Each passage contained the mean length of 525 words. All texts were different from the one being used in the students' classroom.

A thematic organizer was written by the investigators for each passage using the procedure developed by Alvarez (1980). Each thematic organizer contained these components:

- a) three paragraphs which introduced the concept to be studied and cited examples of the concept relevant to the students' experiences.
- b) two sentences which contained the concept. Directions required students to explain the sentences by restating them in their own



words.

- c) a set of 6 or 7 sentences which contained plausible and non-plausible information about the passage. Students were to indicate whether they agree with the statements during and/or after their reading.

Five literal and five inferential comprehension questions were written for each passage by a group of reading specialists. These questions followed the students' retelling. The inferential questions were devised so that none of them could be answered by reading only the thematic organizer. Inferential questions required students to use information presented in the passage.

A passage entitled "The Reformers" from a fifth-grade text was selected for the sixth session. The title of the passage presented the implied concept which was not defined in the passage. The passage, which had 509 words within 39 sentences, was parsed into 57 idea units using the method described by R. E. Johnson (1970). Interrater reliability was .97. Idea units were rated for structural importance (interrater reliability of .97) to identify the least to most important units. Structural units were analyzed for action vs. description content. The division of these were relatively equitable across the four levels. It was determined that differential recall of these units would be relatively uncontaminated by the distribution of the factors. Also, each of the four levels of structural importance occurred approximately equally often in each section of the text. Therefore it was assumed that recall of important units was not contaminated by primacy or recency effects.

### ANALYSIS

After students completed their reading, each was asked to retell the passage and respond to five literal and five inferential questions. Scripts of students' retellings were typed and divided into idea units. Independent raters classified student responses as literal or inferred. Restatements of the information presented on the thematic organizer were coded separately and not analyzed with these data. All protocols were scored according to the degree to which they preserved the meaning of the original textual units (interrater reliability was .91). This scale was used:

- 3 - if the subject's idea is a verbatim recall or good paraphrase of the original unit.
- 2 - if the subject's idea unit is a verbatim recall or good paraphrase of a major part of the original unit.
- 1 - a somewhat vague paraphrase or only a small fragment of the original unit.
- 0 - incorrect response, no text related information.

Responses were also categorized according to their level of structural importance on a scale of 4 to 1. Responses to questions were evaluated as correct or incorrect by independent raters (interrater reliability was .94).

A two-way ANOVA with two factors (groups and trials) with one repeated measure over trials was used. The results indicated the following:

**Literal retellings**—Significant differences were found among group means for literal comprehension across groups and trials,  $F(1,22)=5.49$ ,  $p < .03$  (Combined means for trials 1 and 2 were: Group A, experimental=15.04 and Group B, comparison=8.96). A one-way ANOVA indicated no significance at Trial 1.

**Inferential retellings**—Significant treatment effect for responses at inferential level across groups and trials,  $F(1,22)=19.46$ ,  $p < .001$  (Combined means on repeated measures were: Group A, experimental=6.08 and Group B, comparison=0.50).

**Literal questions**—Significant differences were found among group means on inferential questions across groups and trials,  $F(1,22)=92.57$ ,  $p < .001$  (Combined means on repeated measures were: Group A, experimental=3.58 and Group B, comparison=0.62).

**Inferential questions**—Significant differences were found among group means on inferential questions across groups

and trials,  $F(1, 22)=92.57$ ,  $p < .001$  (Combined means on repeated measures were: Group A, experimental=3.58 and Group B, comparison=0.62).

**Total questions**—Significant differences were found among means on inferential questions across groups and trials,  $F(1,22)=75.65$ ,  $p < .001$  (Combined means on both trials were: Group A, experimental=6.08 and Group B, comparison=1.58).

No interaction occurred for time indicating that time was not a factor related to different performance between groups.

Secondly, the data were analyzed to determine whether the groups differed in their ability to recall structurally important units or preserve the meaning of the literal ideas. Since the experimental group was "primed" on inferred information, it was presupposed that these students may overlook literal ideas as they read to understand the implied concept. As noted above, the experimental group performed significantly better on literal comprehension than the comparison group. The analysis of the groups' performance also indicated that the experimental group recalled more of the most important idea units (4's and 3's). The percentage of most important idea units recalled by students in Group A (experimental) was 63% and 62% on Trials 1 and 2 respectively and for Group B, (comparison), 44% and 29% on the same trials. More than half of the responses given by Group B were of least important idea units.

An interesting finding was also noted when students' idea units were compared for the degree to which they preserved the meaning of the original passage units. Students receiving the treatment recalled more complete propositions than students who were in the comparison group. Responses of students in the experimental group were rated as having high meaning retention and completeness. In trial 1, 94% of responses given by students in Group A and 68% of responses given by students in Group B were rated as 3 (complete restatement) or 2 (nearly complete restatement). On Trial 2, a difference also occurred; 68% of responses of Group A and 53% of responses in Group B were rated as a 3 or 2.

### DISCUSSION

Students' performance on literal and inferential recall was influenced by the framework in which they were encouraged to place the events of the passage. Students used pre-existing knowledge (information about reformers) to elaborate on the implied concept of the text. The orienting nature of the thematic organizer seemed to encourage the reader to produce more important structural units and more complete and meaningful restatements of the propositions within the text and not just attend to the implied information discussed in the adjunct aid.

This study also indicates that the extent to which a textual passage is comprehended is not exclusively dependent upon the reader or the text itself. Instead, the study suggests that certain aspects of reading comprehension may be positively influenced by such factors as the type of organizer given prior to and along with a textual reading.

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### LITERARY VERSUS SCIENTIFIC READING IN COLLEGE—A COMPARATIVE ANALYSIS

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It is a commonly held belief that readers tend to use differing skills when confronted with "quantitative" or science materials that they use for "verbal" or literary articles. The natural inclination or bent of students usually attracts them to college majors which exploit and expand their native abilities. The seemingly unavoidable result of this predilection and training would be a specialized approach to reading matter on the types which may be thought of as scientific, or literary or non-scientific.

As long ago as 1938, Shores concluded that special skills were needed to effectively deal with historical and scientific reading materials. He argued that other areas of study did not need the same skills that science and history (names, dates, facts) seem to require. Twenty years later, Maney (1958) examined the differing skills necessary to successfully function in science material, but did not generalize to other content areas. Kaufman (1975) found that very specific skills seemed to be necessary for accurately processing reading material in

the four major content areas of English, mathematics, history and science. He further stated that specific skills, such as critical reading, did not work equally across disciplines.

In the research recorded above the focus was on topics, fields of study, texts; in short on the content areas. Apparently, the efficient reader would need a large bag of skills in order to succeed in the many areas of study leading to a liberal education. We wondered what we would find if we shifted away from the content area, and focused instead on the student of that content.

The researchers decided to test the hypothesis that: 1) science majors read scientific text more effectively than literary material because of specialized skills demanded; 2) art majors likewise show different reading skills, but probably with opposite results in terms of proficiency, (i.e. the difference between their rate and comprehension favors literary material over scientific); 3) art majors, because of suspected aversion to the methodical scientific topics, show a greater difference between their scores on literature and scientific material than do science students; 4) there is a difference between the reading ability of arts and science students when each sex is considered separately. In short, the primary question was whether arts and science students differ in reading skills, not whether the content require different reading skills.

#### The Study

The subjects were 77 students enrolled in an Efficient Reading class at a large mid-western university. The breakdown was as follows:

| GENDER     |         | MAJOR                                                                           |
|------------|---------|---------------------------------------------------------------------------------|
| 21 Females | Arts    | Technical Communication, Family Social Science, Sociology, Social Work, History |
| 9 Males    | Arts    | Pre Law, History, International Relations                                       |
| 30 Males   | Science | Computer Science, Bio Science Agriculture                                       |
| 17 Females | Science | Animal Science                                                                  |

Available data included scores on the *Nelson-Denny Reading Test, Forms E and F*.

Twenty-three students were eliminated from the original pool of 100 because of first quarter freshman standing, non-categorizable major field, and/or incomplete data.

The first question was whether or not, considering majors and gender, students differed in terms of their reading skills. For both males and females we compared the sub-scales of the Nelson-Denny test for arts and science students. For the Arts female the average percentiles were Vocabulary 44.04; Comprehension 33.6; Total 39.8 and Rate 16.0. For the Female Science group the corresponding scores were 42.3; 36.8; 41.2; and 19. For the Arts males the average percentile were for Vocabulary 50.6; Comprehension 43.6; Total 47.6 and Rate 5.6. The Science males earned corresponding scores of 34.76; 28.5; 30.2 and 10.7. Each sub-scale was evaluated by ANOVA for main effects of gender and major (arts vs. science). There was only one significant finding, at  $F=6.91$ ,  $P < .05$ . This was due to an interaction effect for the comprehension sub-scale. The mean for arts males (43.66) seems to be enough higher to produce the finding. We are inclined to dismiss the difference as of no importance.

The study itself was a comparison of scores for rate and comprehension obtained from reading two rather different articles included in an Efficient Reading textbook.

The literary selection was a charming short story titled "The Fifty-First Dragon," by Heywood Braun. The story has 3,000 words, and is rated 61 (standard) on the Flesch Reading Ease



### Scale.

The scientific piece was an insightful and rigorous article by Herbert A. Otto called "New Light on the Human Potential," a 2,885 word discourse on neurological research, creativity and physical potential, which includes such terms as "Paranormal phenomena," "cerebral radio-communication," and "bioelectronics." The Flesch rating is 46, or Difficult.

The subjects read these selections during the first week of class, before any significant instruction had taken place, which is to say that Efficient Reading instruction had no effect on the scores.

The basic data, to test the hypothesis of specific skills for reading, was the size of the difference between reading scores for literature and science articles. We expected science students to demonstrate both higher rate and comprehension scores on the science material, and art students to earn higher scores on the literary material. That was not what we found. For both males and females the data showed that the literary passages were read faster, regardless of the reader's major. Comprehension was tested by a 10 item test following each story. The results were not so consistent. The males read the literary story with a higher comprehension, but females earned a high comprehension on the science articles. In no case, for either sex, for either article, did we find the cross-over mean differences we would have expected if students read the materials appropriate to their majors with greater speed or comprehension.

A third hypothesis had to do with the difference between scores for literary and science reading as a function of major. We expected that there would be a greater difference for art majors that would show up for science majors. Again, we did not find the expected separation. There were no significant differences, by t test, between literature and science Rate or Comprehension for males or females. The data are presented in Table 1.

### Conclusion

Committed students, well into their major, do not seem to use different skills when doing different types of reading in the fields of literature or science.

In this study we found no significant differences between the performance of science and non-science students whether reading in or out of their special field. Nor, if formal training is used as an index (other than "formal" college reading training) does there seem to be need for any highly specialized skills not generalizable from content area to content area. Finally, we did not find important reading differences by sex. In this sample male art students tended to read slightly better. However, the sample was small and may be highly selected and not easily generalizable.

One of the limitations of the study was that the students enrolled in the Efficient Reading Course are, at least, average students. Students of lesser ability, or significantly greater ability may not exhibit the same traits. The limitations imposed by a small *n* will be rectified as time passes and the data pool grows.

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**MEAN RATE AND COMPREHENSION DIFFERENCES  
BY SEX FOR ARTS AND SCIENCE STUDENTS  
READING LITERATURE AND SCIENCE MATERIALS**

|                  |                  | MALE        |                 | FEMALE       |                 |
|------------------|------------------|-------------|-----------------|--------------|-----------------|
|                  |                  | ARTS<br>N=9 | SCIENCE<br>N=30 | ARTS<br>N=21 | SCIENCE<br>N=17 |
| READING MATERIAL | WORDS PER MINUTE |             |                 |              |                 |
| LITERATURE       | 351.0            | 320.0       | 343.47          | 330.29       |                 |
| SCIENCE          | 338.3            | 304.8       | 335.9           | 328.1        |                 |
| Difference       | 12.66            | 15.23       | 7.52            | 2.176        |                 |
|                  | t=.08            |             | t=.126          |              |                 |
| READING MATERIAL | PERCENT CORRECT  |             |                 |              |                 |
| LITERATURE       | 71.7             | 71.6        | 74.7            | 83.8         |                 |
| SCIENCE          | 73.3             | 72.6        | 69.0            | 71.2         |                 |
| Difference       | 2.2              | 1.0         | 5.7             | 12.38        |                 |
|                  | t=.142           |             | t=1.52          |              |                 |



# EFFECTS OF TRAINING IN STUDY SKILLS FOR SPECIFIC CONTENT COURSES AS REFLECTED IN ACTUAL COURSE ENROLLMENT, GRADES AND WITHDRAWALS OF HIGH-RISK COLLEGE FRESHMEN

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The Developmental Year Program (DYP) at The Pennsylvania State University has been designed to develop the basic skills of selected college freshmen who qualify for admission to the University through the Educational Opportunity Program and the Veterans Program. DYP credit courses are offered in English, mathematics, reading and listening/study skills. After demonstrating competence in the DYP courses, the transition to regular University courses should be made smoothly and confidently by DYP students.

As an instructor in the Developmental Year Program, the author taught RCLED 005B, College Reading Skills Improvement, a required course of all DYP students who placed below the fortieth percentile on the Iowa Silent Reading Tests. Over the year, the course consistently included activities to develop student abilities in comprehension, vocabulary and rate. The instructor felt it was necessary to teach reading skills that would also transfer to the content areas and help students best survive in non-DYP courses.

The importance of instruction in reading for specific applications in the content areas has been noted in a number of studies evaluating the success of content/study skills programs. Pauk (1965) found that students enrolled in a content course taught in conjunction with a study skills course made greater gains in academic grades than another group who took the same courses along with rapid reading techniques. It seemed that students used the rapid reading techniques and neglected the study skills. Swenson (1942) reported earlier that scores on tests of ability to read science materials and on standardized reading tests were substantially correlated with achievement in science class. Thus, rather than rate, practices that taught students to select, organize and manipulate information were found to show significant gains in grade point averages (Tillman 1972-1973; Driskell & Kelly, 1980). Focus-type techniques, such as self-questioning and the use of organizers, affected student retention and significantly increased comprehension test scores (Schnell 1972-1973; Andre & Anderson, 1978-1979).

Recognizing that the same reading skills were not applied in all content areas, Guilford (1980) offered reading for prospective teachers, science and technology, social science and business. As a result of these courses, students felt extended performance capabilities in their fields. Shores (1943) found that good reading in science was related to power (level) in reading comprehension and to vocabulary knowledge but not to abilities in locating information or comprehending the general meaning of a passage. The advantage of direct application of study skills instruction was shown by Stoodt and Balbo (1979) in an economics class where students received higher grades than a control group.

All these applications of study skills in the content areas demonstrated the success of routines and strategies that could be performed to facilitate text learning. Brown, Campione and Day (1981) stressed that in considering learning from the text, any adopted strategy should be influenced by the inherent structure of the text, the compatibility with the learner and his or her existing knowledge, and the text to which the learner must be put—(critical task, gist recall, basic concepts, understanding instructions, etc.). This complex interplay could be further complicated by the professor or teacher who imposed another viewpoint which may or may not coordinate closely with the learner and text.

It was one of the goals of RCLED 005B to acquaint the

students with the expectations of non-DYP content area courses and present the opportunity to students to experience a small segment of an actual course in the most realistic manner. To accomplish this intent, four classes of RCLED 005B students were required to complete three contracts (assigned activities for general reading skills and for specific content courses taught at the University, with each contract taking two weeks for completion). The selection of contracts was made from (a) comprehension (general), (b) vocabulary (general), (c) Math 4, (d) Sociology 1, (e) Biology 11, (f) Psychology 2, and (g) Chemistry 11. These content courses were offered because they were most frequently selected as basic credit courses by DYP students in previous terms. The students worked independently on the contracts with some teacher assistance. The students taking the comprehension contract completed teacher-made and commercially prepared materials that included practice in finding the main idea, recognizing supporting details, drawing conclusions and retaining facts. The vocabulary contract students also completed teacher-made and commercially prepared materials that included practice in meanings of prefixes, suffixes, roots and words in context. The students selecting the content area contracts were "led by the hand" through a chapter of a course text using the SQ3R technique (Robinson, 1961) and stressing other factors (course syllabus, sample tests, author's aids, etc.) that would help pin-point important facts and aid retention.

Each content area contract contained (a) contract guidelines, (b) course syllabus, (c) sample test, (d) book survey, (e) reading and study guide for the chapter and (f) chapter to be studied. Following the two week time allotment for contract work, the students taking a content contract were given a ten-item test based on the format of the actual tests given in the course. As a result of the test, students could evaluate the effects of their study techniques.

## Instructional Procedures

RCLED 005B is a 2-credit course that meets 75 minutes twice a week for a 10-week term. During the study, one period a week was devoted to lecture, demonstration, and practicing study skills. Also, a portion of this period was spent in discussing weekly homework assignments from the text, *Reading for Results* by Flemming. The second weekly class period consisted of a lab designated for contract work only.

## Results and Interpretations

All RCLED 005B students were given a two term follow-up period for an assessment of actual course selections and performance in Math 4, Sociology 1, Biology 11, Psychology 2 and Chemistry 11.

Of the RCLED students who enrolled in Sociology 1, a comparison between the contract group with the no-contract group yielded a significant difference between the two groups,  $t(30) = 2.3613$ ,  $p < .05$ . The RCLED contract group not only showed significantly more students passing, but exhibited only a 15% withdrawal rate as compared with a 38% withdrawal rate in the no-contract group. Unfortunately, not enough RCLED 005B students enrolled in Biology 11, Chemistry 11, or Psychology 2 to have a large enough sample for meaningful analysis.

The results of the Math 4 data appear to indicate that math study skills aren't necessary to succeed in Math 4. On the contrary, The DYP math coordinator designed a math study skills packet for all the DYP math students so that the no-contract math students were given special study aids within the actual content course. Thus, since the contract and no-contract Math 4 groups both received math study skills, the two groups could not be compared.

## Discussion

It appears that the RCLED 005B Sociology 1 content contract had a positive effect not only in increasing the number of

passing high-risk students, but in lowering the course withdrawal rate. The advance preview of the actual course requirements and practice in strategies for successful accomplishments of these requirements are beneficial and perhaps necessary techniques for college survival of RCLED students. Most college study skills programs emphasize reading comprehension, vocabulary improvement and rate, or coordinated programs of study skills taught in conjunction with content courses. Specific course previews packaged into two-week mini-courses (or contracts) could establish successful strategies for high-risk students, give direction to undecided students, and acquaint advisors with a realistic overview of courses to aid in student scheduling. The concept of course previews representative of numerous higher level educational institutions could be extended to the high schools as a part of their college preparatory curriculum for better college preparation and more appropriate placements.

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## EFFECTS OF COMPUTER-AIDED GLOSSING ON PROSE RECALL

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Merging glossing with computer-aided instruction seems natural for directing readers' use of skills and strategies to comprehend and remember information from text. Glossing, as an instructional technique for actively involving students in the process of reading, has been developed to increase readers' attention to places in text where the application of specific skills and strategies—such as paraphrasing and monitoring comprehension—would be appropriate for deriving meaning from expository material (Otto, White, & Camperell, 1980). And results of pilot investigations with classroom students have been encouraging (see Otto, White, & Camperell, 1980, for

detailed results of pilot studies and subsequent investigations and for examples of "glossed" materials). To date, however, gloss notations have been constructed on paper for use with groups of students—not individuals. To truly individualize this procedure, another method of glossing needs to be explored and refined. What is needed is a system which allows the learner to determine when a particular gloss notation is necessary and then to activate just that gloss to direct comprehension.

Computer-aided instruction could provide the flexibility necessary to allow learners to monitor their levels of comprehension while reading and activate at will specific skills and strategy glosses for interacting meaningfully with text. Computer-aided instruction is designed to provide instant service to the learner (i.e., activating and receiving a specific gloss notation). The computer has infinite patience so the learner may process the text at a comfortable rate. Also, since the organization of the courseware is determined by the teacher, gloss notations can appropriately reflect that teacher's expectations for the assigned reading. The ultimate goal for this line of research would be to develop an independent text-authoring system for computer-aided glossing that can be programmed for use by classroom teachers with little or no programming experience (Blohm, in progress). At the present, however, a prototype system has been developed that can be used with college students who have regular access to computer terminals to both direct students' prose learning and to research treatment effects on that learning.

For this initial investigation, the following questions were generated. First, would the students who are provided the opportunity to activate gloss phrases while reading on the computer recall more information than those who are not provided with the gloss paraphrase option? Second, would the number of gloss paraphrases activated influence the quantity of recall? And third, would those opting to activate gloss paraphrases while reading take significantly longer to complete the reading than those not offered the option?

## Method

The design of the study was a 2X2 factorial with eighty college undergraduate Education majors. Each student was randomly assigned to one of the four experimental groups. The first factor was the topic of reading selection which was either heat flow or electrical conductivity. The second factor was the type of treatment which was either reading with glossed paraphrase notations or without gloss paraphrases. The treatment selections for the experiment were the "abstract" versions of two passages used in Royer and Cable (1975). The length, in words, of the heatflow selection was 780 and 672 for the electrical conductivity selection. These selections were then programmed in PL/I computer-language as the text content for the computer-aided courseware used in this experiment. A gloss paraphrase/no-gloss paraphrase option was included for both selections in the "control" file of the courseware program to automatically arrange the sequencing of the selection and treatment in the experiment. Also included in the courseware were separate "gloss-direction" and "no-gloss-directions" files to guide and direct subjects through the assigned treatment and a record-keeping "dump-statistics" file to store each subject's activation of gloss paraphrases by page and sequence and reading rates-per-page for subsequent analysis. (See Blohm, in progress, for detailed description and examples of the courseware program.)

The subjects were run in groups ranging in size from one to five. They were instructed by their respective directions to read their assigned text for the purpose of recalling as much information given as possible. These directions explained that no screen pages could be reread after they signalled for a new page. The gloss paraphrase treatment directions for the two selections instructed those assigned subjects to activate all



gloss paraphrases they felt would be necessary for helping them recall the text content. At the same time, however, they were encouraged to activate *only* those glosses that were really necessary. In contrast, the no-gloss treatment directions for the two selections simply explained to those subjects assigned that no more than eight lines of text would appear on the terminal-screen page at any one time. Following the separate introductory statements and procedures for the two treatments, all subjects were instructed in the courseware to read the treatment selection on the terminal using the assigned technique at their most comfortable reading rate. No time limits were imposed for reading. After they finished their assigned selection, the subjects were asked to write down, in complete sentences, everything they could remember from their reading. They were allowed as much time as they desired for completing this recall task. A graduate assistant who was naive to the purposes of the experiment scored each of the recall protocols against a list of "idea units" established in Royer and Cable (1975).

### Results and Discussion

Results of the study indicated that the group which received the reader-activated gloss paraphrase option on the computer for the heatflow selection recalled more idea units on the free recall measure ( $\bar{x} = 18.57$ ) than any of the other three groups (gloss/electricity— $\bar{x} = 16.15$ , no-gloss/heatflow— $\bar{x} = 12.21$ , no-gloss/electricity— $\bar{x} = 7.15$ ). Both groups receiving the reader-activated gloss option recalled more idea units than did the groups not receiving the gloss option, regardless of selection read. Results of an analysis of variance indicated that the differences were significant between the mean idea units recalled by the two treatment groups ( $p < .000$ ) for both selections. No significant differences were found for the interaction between treatment and selection ( $p < .007$ ). Further analyses indicated that no significant correlation existed between the number of gloss paraphrases activated and the number of idea units recalled for either selection. Evidently, the number of gloss paraphrases activated by students in the gloss option treatment while reading did not increase the quantity of their recall. Finally, results of T-tests indicated that no significant differences existed between the two treatment groups in terms of time spent reading ( $p < .000$ ). The mean reading time was 12.1 minutes for the gloss group and 10.32 for the no-gloss group.

An apparent interpretation for the significant treatment effect found for offering optional reader-activated gloss paraphrases while reading is that the technique facilitated recall. The gloss paraphrase, when activated by the student during reading on the computer, might have activated the student's immediate comprehension by providing restatements of the text which more closely matched that student's prior knowledge and experience. That no significant correlation existed between the number of glosses activated and amount of recall may have been due to the comprehension-monitoring ability of the student which was promoted through the computer-aided treatment. Since the student was encouraged through the gloss paraphrase option to decide regularly while reading if the knowledge structures in the selection were being effectively encoded for later retrieval, the number of gloss paraphrases activated would depend on his or her prior experience with the knowledge contained in the selection. In addition, one activated gloss paraphrase might have had a facilitative transfer effect for understanding other segments of the original text. Hence, the inclusion of the reader-activated gloss paraphrase option may have encouraged the student to not only monitor comprehension in terms of previous experience and learning but also in terms of actively relating earlier segments of text learning to later segments—an important metacognitive skill (Brown & DeLoache, 1978; and Yussen, Mathews, & Hiebert, in press). Since the number of idea units contained in the two selections were not equal (i.e., heatflow=67, electricity=52), the significant difference

found between the two selections was to be expected. That both selections were significantly better recalled by the reader-activated gloss option group substantiates the overall effectiveness of the treatment.

While no statistical differences were found for time spent reading, educationally, the gloss treatment group did spend 15 percent longer reading than did the no-gloss group. Over a longer reading assignment, the number of minutes spent might make quite a difference. Still, the results do suggest that implementing the computer-aided gloss treatment would not severely impinge on teachers' classroom instruction time. However, more testing with this treatment will be necessary before any educationally profitable conclusion may be drawn about the effects on time.

The results and interpretations of this investigation provide the foundation for further research and development of the computer-aided gloss option technique for ultimate implementation and experimentation in the classroom. Data from this experiment should first be reanalyzed for qualitative effects—depth of processing—as well as quantitative effects. Then replications of the experiment should be conducted to increase the data-base for examining the effect of a particular activated gloss on the depth of processing exhibited in the recall of knowledge structures paraphrased to explain the effect of the activated gloss paraphrase. Incorporating additional features (e.g., backpacing, reverse-image highlighting) in the courseware as well as promoting more comprehension skills and strategies (e.g., noting details, seeing author's organization) in the reader-activated gloss notations may further improve students' comprehension of text. The future for the use of such courseware in the classroom is very encouraging. This study and related investigations are viewed as my attempt to capitalize on the use of the computer in the classroom for promoting reading skills and metacognitive strategies to facilitate students' ability to learn from text.

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## RSM2P: A META-COGNITIVE APPROACH FOR TEACHING COGNITIVE STRATEGIES TO FACILITATE LEARNING

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Our concern, in this paper, is with a very specific type of learner. The emphasis on "learner" is intentional. We are convinced that the student we are going to describe is not a "non-learner," "poor learner," "remedial learner," or any of many other labels this student has worn through educational history. A quote from Smith (1982) expresses our position on the ability of this learner to learn.

"... brains learn all the time. This is what brains are, organs for learning. Brains do not have to be provoked into learning or rewarded for learning any more than the lungs need a stimulus for breathing. Lungs breathe, that is their function, and lungs that do not breathe are dead lungs. Children learn all the time—this is the time bomb in every classroom. Children learn, though not perhaps what we think or hope we are teaching them. The question should not be "Why don't children learn?" but "What do children learn?" "What do we teach them in school?"

A child's brain walks a narrow line between boredom on the one hand and confusion on the other, and as a result, children learn all the time. Children will not willingly get themselves into boring or confusing situations." (p. 12)

The "impulsive responder" is a learner who avoids the confusing situations; or more accurately, eliminates the confusing situations. In other words rather than accept that a given problem solving task (e.g. finding the main idea, recognizing sequences, etc.) is either too difficult or that he/she is not sure how to solve it, the impulsive responder simply perceives a different task—one that he/she has learned to solve (remember Smith's description of the learning brain).

Any elementary teacher, secondary resource teacher, or reading specialist is familiar with the impulsive responder—the student who frustrates us when we attempt to determine a pattern of responses in order to prescribe an appropriate educational program. Our response is usually that there is no pattern—that the student does not appear to be using any strategy other than guessing.

However, our work indicates that the student is using a strategy—to solve a problem—but, his/her perception of the problem is not the same as the teachers. The teacher may perceive the problem as identifying the main idea, stating the main character, etc., etc.; however, the student perceives the problem as reducing the amount of time he/she must be the focus of attention. The impulsive responder solves the problem—efficiently. He/she uses a strategy, and that strategy works.

Remember Frank Smith's "learning brain"! How did the impulsive responder learn the strategy, and how did he/she learn to perceive the problem differently? For the teacher there may be many different problems, but for the impulsive responder the problem is always the same—relief from the focus of attention.

Traditionally Kindergarten and First Grade teachers reinforce participation. One of their tasks seems to be to teach the child to socialize, to become part of the group. They do it beautifully! The child is praised for participating. In many cases responding appears to be more important than the response. The following dialogue, although a product of our imagination, is not unrealistic.

The first grade class has just completed reading a humorous story about an animal who is always getting into trouble. The teacher asks, "Johnny, what kind of animal is the story about?" Johnny quickly replies, "A dog." The teacher smiles and acknowledges, "That's

nice, Johnny; there was a dog in the story." Johnny received social reinforcement for his response and is proud—but, the teacher turns to Sally and comments, "But, what animal was the story about Sally?" Sally replies, "An elephant." The teacher exclaims, "That's good!" and goes on to the next question.

Johnny is bright enough to know that an elephant and a dog are not the same. He also knows that what he said was "good." Thus, what he learns is to answer.

However, as Johnny gets older he finds that he does not always receive praise for his responses; in fact, sometimes his peers laugh and the teacher seems to be upset. In third or fourth grade he begins to wonder why his answer is seldom like the "correct" one. He even pauses when called upon—not really wanting to answer. This behavior irritates the teacher—it slows down the lesson. His classmates think that he is slow. Finally, he reinstitutes his old strategy, slightly modified. He replies simply "I don't know." The lesson moves swiftly and the attention is not focused on the impulsive responder.

The impulsive responder becomes characterized as unmotivated and/or distracted. Parents and teachers are convinced that he never attempts to prepare for class or does his homework. In junior high and high school he may even utilize detractors (being the class clown or wise guy) to facilitate his removal before the task is presented.

We feel that the impulsive responder really does not know how to solve the problem. In the beginning the "correct" problem was not perceived. When reinforcement for responding ceased, the learner suffered confusion and reverted to the original strategy to avoid the confusion.

In our program we teach strategies for solving a given problem, or thinking through a task. The emphasis here is on "thinking through" a task. We have found that by teaching these learners some very specific steps for "thinking through" a task, they can be successful (Huhn, 1977). However, we have also found that the method used in teaching the strategy is equally as important as the problem solving strategy. The strategy the learner is taught is a cognitive strategy; the method used in teaching the strategy is a metacognitive approach.

Where do we get the strategies we teach? As suggested by Meichenbaum (1982), we engage in introspection. We perform the task and note what we think, what we do, and what influences our decisions. Next, we look over our notes and develop sequential steps while adhering to two criteria: (1) enough steps to maximize the probability of success, and (2) not so many steps that the strategy is confusing. Cognitive strategies can be developed for any problem solving task. We currently have over thirty strategies for tasks in reading, writing, and mathematics.

Once the strategy is developed, the next step is to teach the learner how to use it. The important thing to note here is that we do not "teach the strategy," but rather, we teach the student "how to use the strategy." Memorizing some steps in a procedure would probably be another task that would frustrate the impulsive responder; however, learning how to "think through" a problem should relieve some of the frustration and confusion the impulsive responder has felt.

We have called our procedure for teaching cognitive strategies RSM2P: Rationale, Steps, Model, Practice (aided), and Practice (independent). This procedure is used to teach any cognitive strategy.

**Rationale.** We feel that it is important that learners know what they are being taught and why. This seems to be especially true for those learners who have not been academically successful. Therefore, we begin by discussing the purpose of the strategy and how using it is intended to help the learner.

**Steps.** Next, we provide the learner with the steps of the specific cognitive strategy in writing. We also go over each step orally to clear up any confusing vocabulary or wording.

**Model.** This is an extremely important step. The teacher uses the strategy to perform a task—"thinking out loud." That



is, the teacher models the use of the strategy while vocalizing the thinking and decision making process. Thus, the learner can see and hear how to perform the task and become aware of how the thought process monitors the performance of the task.

*Practice (aided).* This time the student uses the strategy to solve the problem while "thinking out loud." The teacher assists the "thinking process" by reinforcing accurate student decisions and guiding the student to the correction of faulty decisions.

*Practice (independent).* Finally, the student is given a number of similar tasks, as determined by the teacher, to determine if learning the strategy has affected more accurate performance. Since the student is performing silently, it is no longer possible to observe if the student is using the strategy as written. However, that is not important. If the student is accurate, it does not matter if he/she has modified (personalized) the strategy. If the student is not accurate, then more modeling and practice is needed.

In conclusion, we have found that the impulsive responder does not appear to know how to begin to problem solve or to think through a task. Thus, by teaching cognitive strategies using a metacognitive approach, the impulsive responder is provided with a specific strategy for solving a problem and a model for using "thinking" to monitor his/her performances.

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### CLOZE PERFORMANCE OF SIXTH GRADE STUDENTS ON FICTION, SCIENCE, AND SOCIAL STUDIES

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Since introduction of the cloze procedure (Taylor, 1953), it has been widely researched and discussed as a diagnostic procedure, in ascertaining readability levels, and as a teaching procedure to improve comprehension (Boyce, 1974; Boyce 1976). Jongsman (1971), surveying the research, concludes that the procedure "correlates substantially" with multiple choice and standardized measures of reading comprehension. Hicks (1979) found no differences in mean scores when testing second through sixth grades with cloze passages and an informal reading inventory while Davidson (1980) found a weak relationship between informal reading inventory and cloze performance on science and social studies passages.

Comparisons of students' performance through the cloze procedure have been conflicting as to the relative difficulty of the content areas. Dodd (1973) found eighth-grade students' scores in literature to be significantly higher than scores in science and social studies. These latter two did not differ significantly, except for the below average group whose scores in social studies were significantly lower. Cohen (1975) compared the cloze performance of seventh-grade good readers on literature, science, and social studies passages. These students performed best on social studies and poorest on literature. Davidson (1980) tested fourth- and sixth-grade students on cloze science and social studies passages. Fourth-grade students

scored significantly higher on science while sixth-grade students scored higher on social studies passages. Comparison of cloze performance in the content areas has been limited to predominantly white groups. This study is designed to further explore students' performance on cloze passages in the content areas of fiction, science, and social studies.

#### THE STUDY

##### Subjects

The subjects in the study were sixth-grade students enrolled in a predominantly black middle school with an approximate ratio of 60 percent black and 40 percent white, in Madison County, Alabama. The school selected was representative of the population of middle schools in the geographic area of the city in which they were located. The purposive sampling technique was used to select six heterogeneous classes.

##### Materials

Cloze passages in fiction, science, and social studies were taken from *The Contemporary Classroom Reading Inventory* (Rinsky & de Fossard, 1980). Cloze passages are provided in these content areas at grade levels four through nine. The Harris-Jacobson Readability Formula (Harris & Sipay, 1975) was used to establish grade level readability.

The traditional procedure of deleting every fifth word was followed. Results in the study were based on thirty blanks for each passage. The following levels and percentage criteria are established in the *Inventory*: Independent, 57+; Instruction (Definite), 45-56; Instruction (Caution) 39-44; Frustration (Below 39). Based on an 83-student sample, a correlation of .94 is reported between performance on reading passages and the corresponding cloze passages.

##### Methodology

Students were tested during November, 1981 with all testing conducted by the researcher. Testing occurred in the morning from 8:30 to 9:30 a.m. on succeeding days for students being tested. Testing followed the format suggested in the *Inventory*: administering of a practice selection and administering of two selections on any one day for grades 6-9. All students were administered the fifth-grade fiction cloze passage as a practice passage.

Information from the manual for completing the passage was given to students before beginning the practice passage. Students scored their own practice selection during a brief discussion of appropriate choices. Immediately following this discussion, a cloze passage was administered. The remaining two cloze passages were administered the following day. Passage presentation was alternated to limit order of passage presentation as an effect. The administration procedure for the six classes was ABC, ACB, BAC, BCB, CAB, and CBA, with A being fiction, B, science, and C, social studies. The *Statistical Package for the Social Sciences* (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) was used for computer analysis of the data. A correlated *t* test was used to test for significance of differences between the means of the three passages.

All findings were tested for significance at the .05 level. A descriptive analysis was made of students' performance on the passages by levels established in the *Inventory*.

##### Results

All three passages were completed by 154 students. The means and standard deviations on cloze scores for the three content areas were as follows: social studies ( $X=15.27$ ,  $SD=5.61$ ); science ( $X=13.04$ ,  $SD=4.98$ ); fiction ( $X=12.60$ ,  $SD=4.32$ ). Results showed there was a significant difference between social studies and science and social studies and fiction at the .001 level. No significant difference was found between science

and fiction. According to mean scores, social studies was easiest for this group.

According to percentage correct for the mean scores, the group was performing at the following levels: social studies, 51 percent, Instruction (Definite); science, 43 percent, Instruction (Caution); Fiction, 42 percent, Instruction (Caution).

Combining the two categories for instruction level, 115 students performed at independent or instruction levels in fiction. In both science and social studies, 99 students scored at these levels. Thus, according to levels for instruction, students performed best on fiction with no difference between science and social studies.

Occasional comments made by students completing the cloze passages highlighted the importance of selecting titles for cloze passages that did not create initial confusion. Students, although they had been told that no words could be pronounced for them, frequently asked that the title of the social studies passage "Mutiny" be pronounced. The title of the fiction passage "Disc" was misread as "Disco" by several students. Some students also expressed frustration with a task that was obviously new to them.

## DISCUSSION

This study provides further evidence of differential abilities in content area performance. As in previous studies, results continue to be conflicting regarding the relative difficulty of the content areas for different groups of students. The need for further testing of comprehension through cloze tests in the content areas is suggested by this study. With the *Inventory* providing reading and cloze passages in the content areas, further studies could be conducted utilizing the same reading materials. However, as noted, adjustments may need to be made to assure ready comprehension of passage titles by students completing cloze passages. Additionally, more experience with the cloze procedure before its use as a testing procedure will insure that content area difficulty, rather than the nature of the task, is being assessed. The conflicting results regarding difficulty level from comparing students' scores statistically and descriptively highlights the need to describe data in both ways.

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## DEVELOPING COGNITIVE RELATIONSHIPS IN SOCIAL STUDIES THROUGH TRADE BOOKS

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Our goal in education should be to develop self-sufficient, rational, independent human beings who are capable of functioning satisfactorily in our society. Plugging all students into the same machine, assigning all students the same workbook pages, and/or developing the same skills in all students will not accomplish this. Criterion referencing every conceivable behavioral objective will not insure independent learners. All this usually accomplishes is encouraging the teacher to assign the same materials at different times to different students. Trade books offer the easiest, most adaptable, and a pleasurable means for individualizing the curriculum.

First, let us consider the function of textbooks in the classroom. They serve as a core upon which to focus the teaching of skills and a common base from which to extend knowledge into individual pursuits. Textbooks are designed to impart information. Because of this, they rarely entice students to read them avidly.

Most textbooks condense any subject to minimum essentials, as determined by the bias of the authors. They are generally non-controversial, because they are to be sold to all types of school systems. And, they are written with little style and fail to catch the interest of the reader.

I believe there is also a psychological factor operating. Textbooks are work—and therefore, it is difficult to interest students in reading beyond the assigned number of pages.

This is why we must use caution and good sense when we incorporate the use of trade books in the curriculum. They must *not* become a substitute for the textbook, but become an exciting, appealing means for a student to pursue his/her own contiguous or tangential interests in relation to the core topic. No matter how superb a trade book is, not all students should be made to read it. A variety of books should be available and individual choices should be made.

Let me give you several examples of how trade books can be used effectively. In a popular social studies text, 19 pages, in a book of 848 pages, are devoted to America in World War II. What possible depth of knowledge or of understanding can be developed in reading 19 pages and answering two pages of questions on the topic? But, from some arid, single paragraphs in a textbook can come an intense involvement with a subject, as expanded in reading of trade books.

People, emotion and commitment are missing from textbooks. Here is a paragraph from the social studies text. "The Italian dictator, Benito Mussolini, had a bold plan. He talked of restoring the power of the ancient Roman Empire in modern Italy. To support his plan, Mussolini built up the Italian army and air force. He was proud of his fighting forces and was eager to see them in action." Compare this with Eric Haugaard's *The Little Fishes*, in which Guido, a 12 year old orphan, experiences the war in Italy. Begging, stealing, lying, protecting his friends, watching them die—this was Guido's war—a far cry from Mussolini's dream.

Another paragraph in the textbook tells us—"In 1933 Adolf Hitler became dictator of Germany. And as soon as he became dictator, Hitler set up a police state. A police state is a nation in which the commands of the dictator are law. Special police



stand ready to enforce the dictator's laws and commands, and the people are forced to obey." But, James Forman writes of four German young people who did not obey. In *Ceremony of Innocence*, Hans and Sophie Scholl and two friends defied the Gestapo and wrote and distributed leaflets decrying the "Nazi cancer." Hans continuously fought his fear to do what he felt was right (page 16 & 17). Hans and Sophie died for their beliefs (p. 244) but they are remembered and their moral integrity lives on (p. 248-249).

The horror of German concentration camps is dispatched in one paragraph in the textbook. "In Hitler's concentration camps, suffering and terror were daily events. Vast numbers of German Jews were killed. Some died from slow starvation or torture. Many thousands were killed in gas chambers. By the end of World War II, the Nazis had murdered six million European men, women and children of the Jewish faith." How much more eloquent is the book of poems written by Jewish children under the age of 15 who passed through Terezin concentration camp. Of these, around 100 came back. The poems reflect the horror and the hope that these children held. A 13 year old describes Terezin in the book *I Never Saw Another Butterfly*. A portion of his poem (p. 22) reveals:

#### TEREZIN

That bit of filth in dirty walls,  
And all around barbed wire,  
And 30,000 souls who sleep  
Who once will wake  
And once will see  
Their own blood spilled.

I was once a little child,  
Three years ago.  
That child who longed for other worlds.  
But now I am no more a child  
For I have learned to hate.  
I am a grown-up person now,  
I have known fear.

Another paragraph states "As Hitler's armies conquered country after country millions of people were taken away from their homes to work in slave labor camps. They worked in factories and on farms to help provide the food, weapons and supplies for Hitler's armies." Esther Hautzig's auto-biography, *The Endless Steppe*, tells of one such family in Poland. Torn from their home, they are sent to Siberia to work in a gypsum mine. The will to survive, the sense of family and the incredible sustaining of humor come through as the catalyst that helped them survive. This story of a real family will enhance a sense of empathy with those caught in the turmoil of war.

And, a final example, one paragraph is devoted to the bombing of Japan. "On August 6, 1945, an American bombing plane dropped a single atomic bomb on the Japanese city of Hiroshima. The bomb destroyed nearly all of the city. Three days later, the United States dropped an atomic bomb on the Japanese city of Nagasaki." Compare this with Lifton's *Return to Hiroshima*, (pages 31 + 32). On these two pages she tells of one child, Sadako Sasaki, who was a victim of that bombing. In a low key but powerful statement she tells of her succumbing to leukemia and the effect on her family and friends. The entire book is devoted to a look at the aftermath of atomic war. Not as a condemnation of that specific act, but as a warning for the future.

This same technique of extending the textbook can be accomplished in any subject matter area. Ecology is a prime subject for discussion in social studies, as it has an effect on everyone and there are so many viewpoints. The value of using trade books is that a variety of viewpoints can be presented effectively, while a textbook usually presents one viewpoint.

We rarely destroy what we appreciate, and one phase of ecology is developing an appreciation for our environment. Many books accomplish this, but two come readily to mind. Rebecca Caudill's *Wind, Sand and Sky* is a marvelous evocation of the beauty to be found in the so-called barren wastelands. She makes us see with new eyes. Byrd Baylor has written numerous lovely books reflecting the beauty of nature, and her *The Other Way to Listen* is a lyrical prose/poem that might aide students in listening to as well as seeing nature.

Two author/illustrators question whether change is always positive. Jörg Müller has created two folios of fold-out pictures, *The Changing City* and *The Changing Countryside*. Each folio traces one scene, a city block and a pastoral scene, over 20 years in 3 year intervals. The possibilities for discussion are endless. John Goodall takes one corner in *The Story of an English Village* and shows its transformation from the 14th century through today. The effect is stunning and not a word is written.

Several recent books look at individual topics of concern. *Checks and Balances* explores the many sides of the Alaska pipeline case. *Rescue from Extinction* examines the biology of extinction, citing case histories, and then tells of the way scientists and laymen are rescuing some species from that fate. *The Oceans, Our Last Resort* examines the abuses made on the oceans and offers suggestions for careful management and cultivation of this valuable resource. Numerous books on specific topics are available in today's libraries.

Rachael Carson sums up my philosophy of teaching in her magnificent book *The Sense of Wonder*. When discussing her nephew's knowledge of nature, she states, "I am sure no amount of drill would have implanted the names so firmly as just going through the woods in the spirit of two friends on an expedition of exciting discovery." (p. 18).

Learning is exciting, and we should share it with our students.

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## READING IN THE DISCIPLINES: POST SCHOOLING CONCERNS

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One goal of education is preparation for life. Reading educators concerned with reading in the disciplines are therefore appropriately concerned with their student's future reading/learning behaviors. If reading instruction in the disciplines has had an impact upon behavior this should be partially reflected in the adults' use of related books and mass media. It has been argued (Strang, 1956) that educators are not, in fact, helping their students meet stated educational goals. That argument will be restated here in a different form in order to suggest what educators in the disciplines must do to promote stated goals.

This argument will be pursued by 1) assessing current adult reading/media behavior in terms of the goals of education; 2) relating adults reading/media behavior to their larger educational/socializing context; and 3) emphasizing steps reading educators must take if stated educational goals are to be met within the present and lifelong curriculum.

Information is conveyed to adults through books, newspapers, magazines, radio and television. Since one media stimulates activity and influences activity in the other media-reading in the disciplines will be considered broadly here. That is, given that the goal of teaching reading in the disciplines is to encourage exposure to learning in the disciplines—all media will be considered. Therefore, the term reading/media will here be used to refer to books, magazines, newspapers, radio and television.

### Reading Behavior of Adults

If the reading/media behavior of adults reflects the goals of education—what would those goals appear to be? Consider the status of adult reading/media habits. The research methodology in this area has provided largely survey or descriptive data. This data has been criticized for a variety of reasons, but largely because checklists or reading inventories used in this line of research do not have documented reliability or validity (Purves and Beach, 1972). However, certain patterns of behavior are consistently reported. It appears that most adult reading is functional reading (Sharon, 1973-4); most adults read or at least scan a newspaper daily and over a third of adults spend some time with books or magazines (Asheim, 1956).

Actually, reading of books tends to be a rather exclusive activity—20% of all readers account for 70% of all books read (Purves and Beach, 1972). Waples in 1912, pointed out that "heavy readers are those with little else to do" (p. 184), unfortunately, this worrisome fact still appears to be valid. Reading/learning in the disciplines, beyond the individual's job is limited. The average adult gets most of his/her news and information from television (Robinson and Jeffers, 1981) and believes the news from this source more than other sources (Larkin, et al. 1977). However, television is used largely to pass the time, for companionship, entertainment and to a lesser extent for information (Rubin, 1981). Also, adults who get most of their information from television tend to be more passive or non-involved politically. Newspapers are also used more for entertainment, sensational news, and pictorial material than for information. Adults prefer to read about themselves and their family versus their community and world. (Asheim, 1972; Larkin, et al. 1977).

There does seem to be a growing interest in reading in some disciplines. There is, for example, more interest in science news (Nunn, 1979) and in nonfiction books (Purves and Beach, 1972). This is consistent with the above behaviors since interest in science/nonfiction articles tend to be in areas as better health, diet or areas related to self, as a survey of the nonfiction

'best seller' list indicates.

The factor controlling adults use of media/books tends to be related to visibility and accessibility. The more space given to an item in the news, the more likely people are to read this; the more available materials, the more they are read.

If these behaviors reflected planned educational goals then the goals of education would be described as: 1) learning to use books and mass media for entertainment, 2) acceptance of television as the most valid source of information, 3) use of available sources of information, 4) learning to focus upon self not the world, and 5) developing habits of passive political behavior. Reading in specific areas of any discipline would appear to be for the specialist.

Stated goals of the educational process are obviously different. Education of self was not intended to foster a preoccupation with self or entertainment of self. The importance of preparing students to read i.e. to learn in the disciplines is underscored when these true goals of education are considered. Goals of education generally include: learning to be a problem-solving person and accepting one's responsibility for oneself and one's role in society, learning "to weigh the worth of what we have done or dare to do . . . (Jennings, 1965) and developing habits of "activity of thought" and "the art of utilizing knowledge." (Whitehead, 1929).

To some extent there has been success in reaching these goals, and education—at least higher education—is associated with that success. For example, more educated adults read more and use media differently (i.e. not only for entertainment). Yet, for the greater numbers of our students post-schooling reading/learning in the disciplines, except in job related areas, appears to be minimal.

### Reading in the Disciplines: Lifelong Curriculum

There are, of course, many reasons why education has not made a greater impact of post-schooling reading/media behavior. Two reasons will be considered here 1) the pervasiveness of the non-school curriculum and 2) habits developed by the school curriculum.

There is a curriculum we all face throughout our life—this curriculum runs concurrently with formal schooling and becomes the sole and pervasive curriculum for most adults for more than two-thirds of their lives. This curriculum has well-articulated goals. If we consider these goals as stated and evaluate these also in terms of the goals these reflect for adults, an interesting picture emerges. The life-long curriculum for reading in the disciplines is, of course, that generated by mass media i.e. television, radio and newspapers. The goals of the mass media are 1) to act as "leaders of the masses," by following Walter Lippmans' dictate for developing a "picture of reality on which men can act;" 2) to be the social conscious of the community (Lehnert, 1980); 3) to act as a socializing agency (Courtright and Baran, 1980), to be opinion molders and "to inform, interpret, guide and entertain" (Bond, 1961). If these are the goals of the media then it follows that the media's goal for adults might be interpreted as developing adults who will 1) follow, 2) respond to messages involving social criticism, 3) become homogenized, i.e. be responsive to reports on changing social/cultural moves, 4) seek guidance and their opinion from the press, and especially 5) seek to be entertained.

There are similarities between the goals of education and the media: both purportedly strive for well-informed and civically active adults. Educators, however, seek to develop people who will structure and evaluate information and make well-informed decisions. The media apparently strives to structure information and personalize news to promote specific action.

These differences in goals need to be evaluated to determine if educators are inevitably promoting the goals of the mass media—that is developing uncritical consumers of mass media. If the two curriculum developers are evaluated in light of current adult reading/media habits—the media is meeting its



curriculum goals-educators are not.

### Preparation for the Lifelong Curriculum

If reading media behavior related to learning the disciplines is to reflect the goals of education then educators must deal with the context in which this learning will take place. That is, educators then must prepare students for dealing with mass media or specifically with reading/learning in the discipline from mass media sources.

It may be unfair to criticize the mass market for failing to promote either some of their own highly state goals or the goals of education. It might be argued that if given interests and habits had been developed in the schooling process, the mass media would be able to profitably promote goals stated by educators.

Media experts and educators agree that the continued growth of information, the impact of new technology on an individual's lifestyle, and the importance given public opinion—all require a well-informed, involved, information seeking, decision making public. Most of the information coming to the public in the post-schooling context will come from mass media, and media experts recognize limitations in their presentation of this information. Since these limitations result in the influencing of public opinion or in the potential biased presentation of information—they are essentially propaganda techniques. Those propaganda techniques which serve to subvert however unintentionally, the goals of education need to be recognized by educators. If educators can, in turn, enable their students to deal with these propaganda techniques, they might be more successful in promoting more effective post-schooling reading/learning in the disciplines.

Students are currently instructed to identify 'propaganda techniques' such as use of the plain folks approach and card stacking (Singer and Donlan, 1980). However, these might be termed "micropropaganda techniques" because they exist "within" a given article or source. To become a critical, active, or self-initiating decision maker students must recognize "macropropaganda techniques" or strategies which influence the larger news or media picture.

The goal here in emphasizing macropropaganda techniques is not to develop more animosity toward books/media or to create more cynical consumers, for this might only result in more passive withdrawal from information sources. The goal in promoting recognition of these techniques should be to help students recognize and deal with practical constraints upon themselves and the media. This caution is important for recognition of micropropaganda techniques has apparently been effective. That is, readers are sensitive to these micropropaganda techniques such as "twists of expressions" (Berry, 1976, p. 119) and one wonders if recognition of these techniques has led to the decline in newspaper readership or to the fact that less than 30% of the population state that they accept at face value, statements made in the news (O'Keefe, 1981).

It should be pointed out that media constraints and resultant macropropaganda techniques are closely intertwined with what the media perceives as time and information processing constraints of individuals. The six macropropaganda techniques presented here are all criticisms raised by media people: They have criticized presentation of information in terms of the: 1) focus upon entertaining or "gratifying" readers/viewers; 2) simplification of information; 3) personalization of information; 4) influence or habits of mind; 5) the striving for visually capturing events; and 6) the fact that media is controlled by a few, often vested, interests. The six macropropaganda techniques paralleling these criticisms are labelled and discussed below.

#### 1. *Let me entertain you*

Students must recognize that their own desire to be entertained influences what type of and how much news they are presented. Entertainment is fast becoming a major media goal.

Students can evaluate this entertainment focus by asking, "what are these people saying about me to present me with this?" If they were eighteen and given a dool or toy for their birthday they would be insulted by the 'giver'—students must also realize when their intelligence can be insulted by the news reporting. It might help if students evaluated their own use of media in relation to (desired) self-concept as a person and their (desired) concept of adult peers.

#### 2. *Let me make it easy for you*

Media and book coverage of any topic of information cannot be criticized for clarifying information—but when clarification results in extreme exclusion or distortion of information, students must be concerned. Reese and Miller (1981) suggest that the wealth of available information is so confusing that structuring this information becomes necessary to "mold well-structured . . . well-stocked attitudes."

It is often suggested that today information is so complex that much cannot be comprehended by the general educated public. It is true that today even experts do not even fully understand each other. But this does not mean we must be directed by a very small cadre of individuals but that different information must be sought (consequences, related values). Students need to be accustomed to seeking and weighing multiple sources of information and recognize the fact that sometimes even the experts do not know all the facts. The experts and their interpreters must be respected for admitting when information is not fully known or available and allow adults to understand when a 'leap of faith' is being requested. Students must also learn to a) require that multiple viewpoints be presented by experts and b) that these views and related information be evaluated by experts.

The classroom use of a single textbook, single source of information may in fact discourage a life long habit of seeking varying viewpoints and the constant search for the right answer may inhibit the ability to deal with uncertainty.

#### 3. *You, you, you*

Information is personalized in the media to promote interest. Media sources seek to meet identified interests and to selectively relay information relating to these interests. Womack (1981) has shown that the selective attention of various newspapers to news in the world results in readers acquiring quite different views of the world. It might also be pointed out that interest can be created if an event can be personalized (as hostages in Iran). There is a Catch 22 quality to this phenomena for the media can only capture readership/views in terms of their present interests; it is unlikely that news relating to broader interests will be presented, and thus unlikely that broader interests will be developed. Educators need to develop in students the habit of requiring information on what the event means to the larger unit involved as well as to individuals. If an individual's world view is to grow and not to be totally controlled by media, students need to automatically ask for related economic, social, and political information.

#### 4. *"Brevity is the 'hole' of the mind"*

Space/time of limitations of media result in highlighting and abbreviating reporting of news events. Novak (1975) points out that the nature of media is likely to impact on habits of the mind. The rapid science switching of television, he points out, does not promote evaluation or structuring of information. The newspaper has in effect "imitated" the cryptic television reporting style by highlighting news-briefs. Perhaps these news blurbs are satisfying to students who are accustomed to passively dealing with or "learning" cryptic, isolated bits of information. If students' "habits of mind" required in-depth information, these cryptic presentations would be less satisfying. Students should at least learn to demand a news overview and a rationale for the focus of a news story and to question the cryptic, event-focused nature of news reporting.

#### 5. *"Seeing is believing"*

What is seen on television is believed more. This may not be because television news is actually more accurate. As noted earlier, students have been taught to criticize the misuse of the "word"—they are less critical of the misuse of the picture. Students need to recognize how viewpoints or facts can be manipulated by controlling the angle or frame of a picture.

#### 6. "It is a business world"

The world of science, news, discovery becomes limited when vested interests are involved in a news event. Carter and Adler (1975) point out that 90% of the most widely used source of information (television) is controlled by three networks. The number of newspapers in the country and publishing houses are also decreasing and increasingly coming into the hands of fewer and fewer sources. Book publishers, media sources could not continue if they did not make a profit. Students must consider to what extent this can result in a public disservice. For example, Berry (1976) pointed out that even when a television show had a large audience, it was dropped because the viewers were non-buyers i.e. middle-aged or over (p. 17). Media sources may "slant" information in recognition of a debt to a source of support. There are institutes and grant funding institutions dedicated to bringing to the public to their own views by news releases. This can expand the range of information presented when the source and orientation are identified. Students simply have to inquire about the political and financial interests/goals of those who control their information source. Moreover, students can learn to identify slanting of the news better, if the controlling interests are clear.

#### Summary

The schools are not meeting their goals in developing concerned active citizens who seek to continue to read/learn within the disciplines. The fault for this may be shared by the schools curriculum and the wider life-long curriculum provided by the mass media. Critical evaluation of the mass media might result in positive use of and changes in both the school and lifelong curriculum.

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#### READING HABITS, PATTERNS, AND INTERESTS OF OLDER ACTIVE READERS

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The study of older readers is important for several reasons. As the population of the United States continues to increase at upper age ranges more must be understood about aging readers so that adequate services might be provided. From another perspective, historically documented reading phenomena may yield valuable clues for early encouragement of lifetime reading habits for youth.

Current research on the reading of the elderly yields little conclusive evidence concerning life-long reading (MacLean & MacLean, 1979). General surveys and literature reviews (Moshey, 1972; Sharon, 1974; Harvey, 1979) report a lessening of reading time at upper age levels, and a preference by good readers for newspapers and magazines, poetry, history, historical novels, biographies, and travel books. Watson and her associates (1979) and Harvey and Dutton (1979) observe that novels with sex and violence and science fiction are not preferred reading by retired citizens. Less well-educated individuals are judged to be reluctant readers.

#### Purpose of the Study

With few exceptions, the research on older readers has been conducted using populations which include habitual readers as well as those who do not or cannot read. It is the intent of this study to focus exclusively on the habits and behaviors of individuals in their retirement years who are active lifetime readers. Although the observations from this study cannot be generalized to a broad population, they present a more clearly delineated profile of the active reader in retirement.

#### Related Research

Noteworthy investigations of older readers present some insights into reading as a process for older readers. By analyzing



the reading miscues of older readers. Watson et al. (1979) and De Santi (1976) imply that active readers process in large linguistic units and that the push for meaning is a processing strength. Although oral reading is unnatural to most good adult readers, the miscue analysis approach offers opportunity for direct behavioral observation.

To discover whether or not the purposes for reading have a life span perspective, Wolf surveyed 249 retired persons in Kent County, Michigan. Using an 18-item questionnaire and taped group interviews, he discovered that older readers read to fulfill needs beyond functional literacy and that reading provides coping mechanisms pertinent to the problems of aging. Ngandu and O'Rourke (1979) asked 267 older citizens to complete a questionnaire concerning reading and other behaviors. Their results suggested that reading was done for enjoyment and information. Time spent in reading was equivalent to time watching television.

Similar conclusions were drawn by Ribovich and Erikson (1980) following home interviews with 30 randomly-selected subjects who were members of the American Association of Retired Persons. Of the group interviewed, most read for enjoyment and to "keep current." Television was cited as a major source of news with newspapers a distant second source. Problems which were identified as interfering with reading include visual constraints (20%) and fatigue. Early family influences suggested that good readers were generated from school-oriented families with a mother or grandmother who read to the children. For Ribovich's and Erikson's subjects, the amount of reading increased from middle to older ages.

These investigations provide important insights into the behaviors of older readers. The study presented in this paper attempts to describe more completely behaviors of good older readers. It further attempts to utilize the reading autobiography recommended by Ngandu and O'Rourke (1976) as a method of investigation which "... might help isolate particular variables which seem consistent among these older citizens."

### Subjects

The subjects for the present phase of this investigation were 21 retired citizens currently living in Virginia and Pennsylvania who ranged in age from 70 to 95. They presently live in private homes or apartments, a residential hotel, a private retirement complex, and a church-affiliated retirement complex. The sample included 17 women and 4 men; a more skewed distribution than the 70:30 ratio reported by the Harris Survey (1975) conducted for the National Council on the Aging. Twenty of the subjects were white; one was black. They were individuals who identified themselves as active readers and who agreed, upon request, to participate in an in-depth taped interview conducted by the investigators.

### Demographic Characteristics of Active Retired Readers

Demographic data gleaned from the interviews revealed the following information about the subjects:

1. They were born in the southeastern, northeastern, or midwestern regions of the United States. One individual was Canadian.
2. They were from families ranging from only-child status to seven siblings. None of the subjects who were parents had more than three children—the majority (42%) had two children.
3. They include six single, three married, one divorced, and nine widowed individuals.
4. An analysis of the highest education level attained by the subjects would refute the observations in previous studies that education is a factor in good reading. The present sample included the following distribution:

Highest Education Level:  
grammar school (8th-10th)

|                   |    |
|-------------------|----|
| high school       | —6 |
| Bachelor's degree | —6 |
| Master's degree   | —6 |

Ten of the subjects indicated evidence of continuing education, both formal and informal, beyond the highest level of education attained.

5. Career experiences for these individuals covered a wide range of occupations over a life span. More frequently occurring occupations included teaching, homemaking, military service as a civilian or officer, library work and clerical work. Unique careers mentioned were children's theater director, fashion model, and newspaper feature writer. Professional affiliation with organization appeared to have been generally discontinued, although four women were still active in the American Association of University Women.

6. Current memberships in social and religious groups ranged widely, and, in some instances, paralleled hobbies and interests other than reading. Frequently mentioned social memberships included church groups (10), women's clubs (6), historical societies (3), and fine arts societies and organizations (10). Only three individuals reported membership in organizations designed for retired persons.

7. Avocations in addition to reading included 24 types of activities. Interest in the theater, music, handwork, and travel were most frequently reported.

8. Of the 21 subjects, 13 stated that they were in good health. A number (17) of typical health problems were identified with visual problems, arthritis and hypertension reported most frequently. The interaction of physical factors and reading is addressed in subsequent discussions.

### Method

Each subject was interviewed for 60 to 90 minutes at his/her residence at a time convenient to the interviewee. Subjects were given an explanation of the project and were informed that the taped interviews would remain anonymous. An interview guide prepared by the investigators included questions designed to elicit elaborated responses concerning reading habits, reading interests, and the impact of environmental and physical factors on reading. The guide was preceded by a case history survey also conducted orally. Interviews were taped for greater accuracy of data gathering. The taping also provided an analysis of the nuances and affect coloring an individual's response, increasing the opportunities to analyze the behavioral patterns described.

Information obtained from the interviews was categorized by recording behaviors from written notations and taped interviews.

### Observations

#### Developmental History of Reading Behavior

Typically, the active older reader in this study recalled an early interest in literature. Three of the subjects reported having learned to read before entering school. Few individuals could remember the exact method for learning to read, but most experienced early the joy in reading that one octogenarian's remarks illustrate: "I remember that I was so happy when I got to school and learned to read and write all by myself." Specific early reading impressions recalled included learning by the "whole word" method, rapid reading of adventure stories, and time spent in the free reading corners of the classroom.

As might be expected, the mother was influential in early reading development as a model and as the person who most frequently read to the child. Individuals who were reported as singularly influential in guiding early reading were mother (57%) and father (33%). Others mentioned were private tutor, teacher, neighbor, aunt, and sister. Motivating environmental factors during the early years of reading included the presence of home libraries (29%), family read-together times (29%),

early exposure to the public library (23%), and books received as gifts.

Favorite childhood books remembered represented a wide range of types with fairy tales, adventure and series books being among the most popular. Classics, such as *Treasure Island*, *Alice in Wonderland*, *Lamb's Tales of Shakespeare*, *Robinson Crusoe*, and *Little Women* were noted. One woman indicated that her family could only afford to buy the very best literature; therefore, she had read few children's books. She had, however, read Dicken's *Tale of Two Cities* and Hugo's *Les Miserables* by the time she was twelve.

During the adolescent years, the subjects described patterns which incorporated the reading of the "forbidden" books from which they learned about human sexuality. Such stories as *The Sheik* and *The Flaming Youth* were read with guilty excitement. Growing adult interests were illustrated by the reading of the works of Edith Wharton, F. Scott Fitzgerald, Dickens, Poe, Hugo, and D. H. Lawrence. History and historical fiction endured as popular types of reading.

Patterns of reading in the middle years were characterized by the same types as are found in current reading by 38% of the subjects. Readers enjoyed more contemporary fiction, more interest in travel, more romantic novels and more career-related materials.

Mothers reported the beginning of late-night reading habits (after the children were in bed) which appeared to persist into retirement years. Regular use of the library had been established and continued to be an important part of the adult reading routine.

Several fascinating patterns were described which depicted the avid reader. One clerical worker mentioned reading on the bus to and from work. A teacher/mother indicated that she usually had two books going at the same time—one professional and one for pleasure reading. Three women mentioned going on "reading orgies," forsaking food and sleep and putting housework aside to read intensely for long periods of time. The social status of reading was illustrated by the comment of one woman who said, "I went through a real snotty period, thinking I couldn't read anything that wouldn't benefit me intellectually." A scientist recalled that his pace slowed during the college and career years when he was reading detailed information and wished to avoid re-reading. He traced this behavior to his current inability to change reading pace to adjust to different types of materials.

The behaviors recalled seemed to reflect readers who sustained continued interests which began early and expanded throughout adulthood. The influence of one's career or work experiences was judged to be significant by 62% of the subjects. As one woman said, "Everything led to the library." Conversely, it might be suggested that interest in reading may have predisposed some individuals to select their particular careers or to choose certain avocations.

### Observations of Current Reading

#### Routine:

Daily reading was reported by all but the one subject who is now blind. He has readers for four hours weekly and reads five to six of the "Talking Books" (Virginia Commission for the Blind) every two weeks. Of the 21 subjects, eight said that they read anytime they can; however, particular patterns were observed. Early morning newspaper reading is favored by 10 (48%) of the group. Bedtime is the second favorite time for reading, enjoyed by nine (43%) of the group. Late-night reading seemed popular for five women (24%). Habits carried over from child rearing years and coping with the pain of arthritis seem to contribute to the establishment of the late-night routine.

#### Kind of Reading Materials:

Consistent with survey findings reported by Moshey (1972),

Sharon (1973-74), and Ngandu and O'Rourke (1979), the newspaper was one of the most popular reading materials. Twenty subjects read the newspaper daily with 14 (67%) preferring the morning paper. Other newspapers read routinely, by eight individuals included the *Wall Street Journal*, *New York Times*, the *Washington Post*, and the *Richmond Afro-American*. Magazines were regularly read by 16 (76%) of the subjects; however, only nine (42%) reported subscribing to magazines.

A consistent pattern of preference for fiction or non-fiction was not in evidence for the group interviewed. Seven (33%) of the subjects stated a preference for fiction, while eight (38%) preferred non-fiction.

The preferred categories selected by the subjects in this study correspond closely to those reported by Moshey (1979) and Ribovich and Erikson (1980), who found that lifetime readers tend to enjoy biography, history, historical fiction, and mystery.

A phenomenon reported in this study which has not been discussed in other studies is that of re-reading. Nine of the 21 subjects reported that they frequently re-read material that they have previously read, sometimes as often as five or six times. Re-read materials were usually books which have been childhood favorites, Shakespeare's plays or works of preferred authors. The re-reading phenomenon did not appear to be a function of lack of material; rather it seemed to be a desire to recapture a mood established as the reader interacts with the text.

Interest and taste in magazines or journals range widely for this group of readers. Currently the 21 subjects reported reading 35 different magazines and one professional journal. Avocational interests appeared to control selection in magazine reading. The most popular magazine choices were categorized as women's/ homemaking (61%), news/political (48%), and *Reader's Digest* (38%).

### Access to Books and Other Reading Materials:

As a whole, the subjects expressed minimal concern with access to materials. They knew how and where to get the types of materials they wanted to read. It was also noted that they kept in their living quarters selections of newspapers and current magazines, a book or two currently being read, and small collections of well-bound keepsakes. Few of the subjects had room for extensive libraries in their present living arrangements; consequently, books were in continuous flow from library to reader or from reader to a friend or relative. Because of this continuous flow, a trend in access did not emerge. Bookmobile users were exchanging selections on a two-week basis.

The most common sources for reading materials for the subjects were the public library (71%), direct purchase of hardback and paperback books (71%), friends and relatives (43%), and residential libraries (33%). Other sources mentioned less frequently were gifts, social club libraries, church libraries, and state library. Book club subscriptions represented a rather insignificant access mode for these retired readers. Two valuable resources for blind and partially sighted persons were used by the one blind man and a visually impaired woman. The Talking Books, sponsored by the Virginia Commission for the Blind, and the Virginia Voice for the Print Handicapped, were considered excellent alternative ways of enjoying literature, poetry, news, and feature topics. The former involves recorded literature, while the latter offers special radio broadcasting of current news, features, and literature.

For the subjects in this study, cost was not a factor in access to reading materials. Five people mentioned that cost did affect the purchase of books; however, three of the four understood price in the context of increased publication costs. Paperback books were seen by some as a great contribution to readers.



### Sharing Reading:

In describing a model reading program for nursing home residents, Gentile and McMillan (1979) recommended twice weekly discussion groups and volunteers to assist reading. They further suggested that literary experiences be directed toward developing self-worth, and physical and mental well-being. Lovelace (1976) and Wilson (1979) designed activities to enhance the lives of older citizens in a nursing home and retirement center. Both suggested that sharing reading appeared to be more social than intellectual and that highly-structured group activities were rejected by their subjects. The present survey of active retired readers supports the conclusions of Lovelace and Wilson.

Books were shared by the subjects in a fairly intimate manner, primarily with friends (67%) or relatives (57%). Four individuals participated in a monthly reading group, although interest in reading groups in general was not strong. A common view expressed was that it was difficult to find someone with exactly the same interests and tastes.

### Physical Factors Influencing Reading Habits:

Serious visual problems were the most frequent deterrents to reading and included such debilitating conditions as cataracts, glaucoma, severe deterioration, and total blindness. Other chronic visual problems reported were dissatisfaction with small print, eye fatigue, and need for more light. Sloane and Kraut (1975) have emphasized the need of older citizens for increased light citing the miosis of pupil growth and the yellowing of the crystalline lens as aging progresses. Compensatory behaviors to accommodate vision reduction included the use of magnifying glasses, large print materials, audio materials, and skimming and scanning techniques in addition to the use of reading glasses.

Four subjects observed that their reading pace was getting slower and that they tired more easily. Three women complained that it was difficult to read "big heavy books" which were uncomfortable to hold. Arthritis appeared to have mixed influences on reading habits. Two subjects remarked that it was difficult to walk to the library because of an arthritis condition; while two women felt that reading helped them to pass the time and to cope with the pain experienced with this ailment.

### Purposes and Values of Reading:

The purposes for reading for an older active reader do not appear to differ from adult readers in general. Eleven subjects in this study stated that they read primarily for pleasure and entertainment. Thirteen readers cited informational motivations for reading. Two questions were asked of the subjects concerning values in reading: (1) What makes a book good for you? and (2) What is it about reading that has enabled you to sustain interest in it?

Responses to the first question include appreciation of writing style (38%), an engrossing subject or topic (48%), and well-developed characters (14%). Two people mentioned action as an important ingredient in a good book. Four readers indicated that the physical properties of books, such as paper quality, binding and print size also contributed to their enjoyment of a book.

The question of reading as a sustained pastime elicited the most emotional responses, which were difficult to classify specifically. Vicarious experience through books was illustrated by comments such as, "I play all the leading characters" and "It takes me into another world." Companionship and need fulfillment motivations were expressed in statements such as, "It's a friend" and "I can be by myself and feed my own needs." Curiosity about human behavior was suggested in the following comments: "It's the best way to relate to human experience"; "I am interested in people and what they have done." Other

values expressed suggested that some life-long readers are curious about scientific phenomena and the human condition throughout history. Several subjects felt that one was born with the tendency to be a reader—"It's in your blood."

### Summary

Although conclusions about older active readers based upon this study are tentative until validated by a larger sample, several characteristics appear to be quite consistent across a range of educational levels.

- Active readers in retirement started reading early under the support and guidance of family.
- Good readers are aware of literary resources and continue to enjoy preferred types of materials.
- They add new types as environmental influences change and discard other types of materials which no longer have relevancy for them.
- Reading for these people is personal and most are quite content with a minimum of social interaction related to their reading.
- As a group, these readers were articulate, alert, and mentally active.
- They maintained a sense of humor and had other interests to compliment reading.

Kingston (1981) was correct to question those gerontologists who feel that active participation in social groups is a better predictor of adjustment than the more solitary activity of reading. For the readers in this study, reading appeared to be a concomitant of good adjustment and good mental health.

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### THE OLDER ACTIVE READER: A COMMENTARY ON DUNCAN AND GOGGIN

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The interview research reported by Duncan and Goggin<sup>1</sup> is both important and interesting. The number of elderly Americans continues to increase and providing for their welfare is a problem which looms larger with each passing year. By applying our knowledge of the reading habits and behaviors of elderly and retired readers, we can take positive steps toward two important ends:

1. We can better predict our own behavior during our retirement years and thus prepare for our own retirement.
2. We can improve the lot of our present senior citizens by making it easier for them to pursue the habit developed from a lifetime of reading.

The finding that all read daily except for the blind person (who therefore listened to "talking books" and hired readers), suggests that retirement villages and nursing homes should have bookstores, book exchanges and/or bookmobiles to guarantee that a supply of books remains available to the elderly. And, since nearly all read a newspaper each day and most read magazines regularly, these materials also should be easily accessible (at minimal cost to those on retirement incomes). Since many enjoyed rereading a book read earlier, even during childhood, the book supply should include some of the classic children's books of the time period when the retirees were children.

Since the subjects enjoyed discussing their reading with close friends and with relatives, but usually did not want to participate in organized book discussion groups, it would be appropriate to suggest that friends and relatives first read the books they plan to give or lend to the elderly. By so doing, they can become discussants of the type most preferred by older persons—a relative or close friend.

Difficulties in vision were reported by a number of the interviewees. These can be ameliorated somewhat by providing brither lighting, magnifying glasses, and/or large type books. However, the problem which holding a book presents for the arthritis victim seems much larger to solve. Perhaps computer-controlled text printed on a large screen could provide reading material adjusted to the arthritic reader. Or perhaps microfiche readers could help. As our technology improves, the needs of our older citizens should not be forgotten as we find applications for it.

The finding that the reading patterns of old age were extensions of patterns formed during earlier years is a significant one. Duncan and Goggin cited the case of the mothers who developed the habit of reading late at night because they didn't start until after their children were in bed, pointing out that these women continued to be late-night readers as senior citizens. It would seem that nursing and retirement homes should provide for such reading habits to continue, rather than enforcing sometimes arbitrary routines which conflict with a lifetime reading habit.

In summary, the findings of Duncan and Goggin are sufficient to generate both greater understanding of elderly active readers and some research into ways in which they can pursue reading

actively even with the obstacles presented by age. Such provocative and productive research deserves to be continued.

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<sup>1</sup>Duncan, P. H. and Goggin, W. F. Reading habits, patterns, and interests of older active readers. Paper presented at the Second Annual Meeting of the American Reading Forum, Sarasota, Florida, December 1981.

### READING HABITS AND PATTERNS OF ENTERING COLLEGE STUDENTS IN STANDARD AND COMPENSATORY CLASSES

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Virginia Commonwealth University has an open admissions policy and thus admits some students with marked difficulties in reading—particularly for the types of reading required for success in college. A course offered by the Division of Teacher Education, Reading and Study Skills (EDU 100), attracts many of these marginal students. Since I teach this course fairly regularly, I have become interested in the factors which operate in these students' lives (and which have operated in the past) which may be presumed to have significance for their reading deficiencies.

The purpose of this paper is to explore the reading habits and patterns of students enrolled in the Reading and Study Skills course, certain demographic characteristics of the group, and to compare them with a group of students with adequate to above adequate reading ability (i.e., students enrolled in English 101, Composition and Rhetoric). Seventeen students in the Reading course and sixteen in the freshman English course were interviewed using an adaptation of an instrument designed by Duncan and Goggin (1981) for exploring the reading patterns of elderly readers. The students were interviewed individually and, in the case of the Reading students, responses were taped as well as written by the author. The noise conditions under which the English students were interviewed made taping impractical, so their comments were written only. The interviews took approximately twenty to twenty-five minutes and the Duncan and Goggin framework was not rigidly followed. That is, if the interview took an unexpected but apparently promising turn, the serendipity was exploited. New factors were identified in this way and questions relating to these factors were incorporated into subsequent interviews. Thus, while all students were asked a nucleus of questions, some students responded to additional inquiries. The interviews were held during October and November of this year. No statistical manipulations of the data were attempted. Rather, the study sought to highlight salient contrasts between the two groups which are hypothesized to relate to reading.

#### Demographic Characteristics

There were marked demographic contrasts between the two groups of students reflecting ethnic and, probably, social class differences (although SES data *per se* were not available).

The students in the English course were predominantly female, aged eighteen or nineteen, white and from outside the Richmond area. All but one were single and all but two had enrolled in college immediately following high school. All were full-time students, all were freshmen, and about two-thirds had no outside employment. Approximately two-thirds of these students planned to major in art or in art-related fields. Of the students in the Reading course, six were males. The students were older than their English course counterparts (about half of them were over nineteen) and about half of them had not proceeded to college directly from high school. Two-



thirds of the Reading course students were black and three-fourths of them were from the Richmond area, lived off campus, and all but four of the seventeen were working in addition to studying. These students were equally divided between freshmen and sophomores and included one junior. Two-thirds of these students planned to major in business or business-related subjects.

An interesting contrast between the groups emerged in the matter of career goals, with the English students demonstrating considerably greater specificity in this regard. Goals such as "theatre therapy, designing book covers, designing industrial interiors, medical illustration, editing a fashion magazine" were reported. The reading course students showed less clearly articulated goals. Responses such as the following were elicited: "To do better; to get a good job in sales; to be a business executive; to be in politics; to work in information systems;" although several responses were quite specific. It would appear that students in this course do not simply need help in reading. It would also seem likely that a good way to approach their reading instruction would be through materials exploring the world of work, particularly materials relating to the students' career choices.

Virtually all the students interviewed reported having avocations, usually several. About two-thirds of the English students had hobbies that were related to their career goals, while only one-eighth of the Reading students had hobbies related to their career aspirations. Thus, the English students reflected an integration of career and lifestyle, while work and recreation were apparently dichotomized by the Reading students. It is interesting, though somewhat disheartening to note that reading was named as a hobby by only five students.

Neither group was notably involved in organizations either on or off campus. Studies and jobs apparently had greater salience for these students at this point in their college careers.

During the course of interviewing, the matter of parental reading practices surfaced and from then on was included in subsequent interviews. In any extension of this study, it would be well to explore the students' perceptions of their parents as readers, but, on the basis of the fragmentary data gathered here, the English students were more likely to report that their parents were readers, that children's books had been available to them and that their parents had read to them when they were children.

### Reading Patterns and Habits

Virtually all the students in both groups reported that they read now. But their comments about their reading differed. Students in the English course were apt to proffer the titles of favored books: *Steppenwolf*, *Forever Amber*, *The Invisible Man*, *The Women's Room*, and favorite authors: Gibran, Rand, Faulkner, Tolkien. In no case did the Reading students advance books or authors.

Responses to the second question relating to students' routines for reading displayed more similarity than disparity. More students in English, however, would be considered moderately heavy readers (reading more than two hours per day).

With regard to the variety of materials read, students in the education course were more likely to read the newspaper than were the English students, though this may have been an artifact of the study—the English students being dormitory dwellers without ready access to newspapers. Both groups of students are magazine readers. All but one of the English students reported reading magazines as did about half of the Reading students, but the latter were more likely to report themselves as "occasional" readers. Both groups cited magazines more frequently than other types of reading material. While there was some overlap between the magazines named as favorites (*Cosmopolitan*, *Ebony*, *Essence*, *Glamour*, *Newsweek* and *Time*), students in Reading cited *Black Collegian*, *Business Week*, *Richmond*, *Lifestyle*, and *Sports Illustrated*, while students

in English named *Biology Digest*, *Family Circle*, *Life*, *Mademoiselle*, and *Smithsonian*.

English students were more likely to read books and to mention specific titles. The Reading students, when asked if they read books, responded in terms of textbooks. The English students apparently didn't think of mentioning texts when asked about their reading.

Another dimension explored in the study was the consistency of reading interests over time. Differences between the groups in this aspect were not striking. Reading students divided about 50/50 on whether their reading interests had changed or remained constant. Of the English students, one-third reported that their interests were long-standing, while two-thirds reported changes. Changes were generally in a positive direction and reflected an increased desire to read as a pastime and an appreciation for the "meatier" materials of high school and college. When asked if their choice of career had affected their reading habits, only about half of the English students responded affirmatively, while three-fourths of the Reading students acknowledged the impact of career, e.g., "I certainly wouldn't read economics and accounting except for my career." The impact of college on these students' reading was less than happy according to their comments. "Boring courses like philosophy don't exactly motivate you to read." "College has made me read more, but like it less."

When asked to tell what they found valuable about reading, the English students responded with slightly more comments than did the Reading students, but their comments were more varied, more difficult to categorize and reflected a more individualistic perspective on reading. These students apparently marched to their own reading drummers. For both groups, reading for information was the most prevalent value cited (by almost half the students in each group). The value of broadening one's perspectives was the second most frequently named by both groups—a close second for the English students, a distant second for those in Reading.

When asked where they obtained their reading materials, the English students cited a wider variety of sources and were less likely to report difficulty in getting access to materials. The university library received several negative comments from both groups (one Reading student complained, it was "too quiet") but in general was found to be adequate.

The effect of the current price of reading materials was the next area explored. Of the 16 English students, seven said that cost was a factor, while only three of the reading students answered similarly. It is interesting to speculate as to why these students should find cost so negligible. Is it because they live at home and have access to parents' materials, or is it because they do little reading outside of the newspaper and assignments?

All of the reading students reported discussing their reading with other people at least sometimes and most of the English students did so, too. The Reading students were most likely to share with their families, than with friends and classmates. The English students (mostly living away from home) sought out their contemporaries (friends and classmates), but also cited family members as those with whom they shared their reading.

Similar responses were made by both groups with regard to physical obstacles to reading. Only two such problems surfaced: fatigue and visual difficulties and these were cited by a minority of both groups.

Most students did report that there were other barriers to their reading, however. For both groups, lack of time was the number one problem, but it was cited more frequently by the English students. The Reading students reported many more barriers to reading, including reading difficulties *per se* and problems with concentration. These were not mentioned by any of the English students.

Among the more interesting findings of this study were the

suggestions students made for facilitating their reading. Both groups requested more interesting assignments, more interesting lectures and an earlier start on required reading. The English students pleaded for multiple copies of books in the library and advocated *more* required reading in college. Their Reading course counterparts asked professors *not* to overload them with required reading, requested a quiet place for study and courses in reading improvement.

The responses of students in developmental reading reveal some disadvantages beyond the university's purview but there are several areas in which positive steps could be taken. Students with marginal reading skills should have reading instruction related to their career goals and in materials related to their required and major courses. They should be encouraged to devote a greater proportion of their time to reading and to go beyond the daily newspaper for pleasure reading. Care should be taken to indicate the relevance of required readings and to give some attention to students' interests where possible. Pleasurable aspects of reading should be highlighted. The practice of sharing reading was valued by the students and opportunities to do so should be built into their courses. It may never be that these students, entering college with marginal reading skills, will find the demands of college reading easy to meet, but it by no means appears that the university's effort is "too late." It should not be "too little."

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## READING HABITS AND PATTERNS OF IN-SERVICE READING TEACHERS IN PUBLIC AND PRIVATE SCHOOL SETTINGS

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The model of literacy presented by the regular classroom teacher is highly suspected to be a major factor influencing students' behavior as they are taught to read. Teachers who present a literate model to which their students can aspire often influence the subsequent reading behavior of their students. The result is that students can readily deduce that reading is not simply a school tool, but a skill needed for life long survival. Given this information, a survey of regular classroom teachers' reading habits seems an appropriate vantage point for beginning to think about both pre-service and in-service training which will include insurance that the products of our teacher training institutions will at least be literate.

As early as 1973, Zahorik warned of the possible relationship between the teacher's own reading values and the achievement of his/her students. Speaking somewhat disparagingly, he wrote, "By their own attitudes and behaviors some teachers communicate to students that reading is an unimportant activity..." (Zahorik, p. 56). Cogan (1975) subsequently studied elementary school teachers and concluded that they did little professional reading and that those journals which they did read were most often of a pragmatic nature. More recently, Joseph and Polonsky surveyed both secondary teachers and elementary teachers and concluded among their findings that elementary teachers spent more of their leisure time activities listening to the radio or viewing T.V., as opposed to reading (Joseph & Polonsky, 1981, p. 15). If such a dismal picture exists as a matter of fact among elementary school teachers of reading, can in-service or pre-service offer a remedy?

This present research was designed to survey the reading behavior of elementary school teachers also involved in supervision of practicum students who were enrolled in reading course work leading to initial certification as elementary teachers in grades N-6. Following the survey, the results were examined against the questions posed by Rath to determine if individuals valued reading (Rath, 1966, p. 27). This plan was employed as a means of collecting the desired data with some degree of indirectness, while at the same time testing the validity of the instrument used. Asking teachers questions in a more direct manner might facilitate teachers who, like their students, have learned to supply the "right" answer.

In order to accomplish this design, 38 male and female classroom teachers of reading were asked to respond to a modified version of the questionnaire designed for the study by Joseph and Polonsky (1981). Those individuals choosing to respond to the questionnaire were regular classroom teachers who taught all subjects in addition to reading to children in grades 1-2, in both public and private school settings.

One hundred and twenty questionnaires were distributed to those students who were engaged in course-related field work in reading during the early days of October, 1981. Of those teachers approached, eighty-two or, 68 percent, refused to respond. The most often given reason for their refusal had to do with their doubts relative to the subjectivity of the survey instrument. One prospective respondent was heard to reply, "It's just another way to establish that we are illiterate, and I simply will not do it." The thirty-eight, four male, and twenty female, who did agree to respond represented a return of thirty-one (31) percent. Of the thirty-eight completed surveys, fifty-five (55) percent were college graduates, and forty-four point seven (44.7) percent had attended graduate school. Sixteen, of forty-two (42) percent, of these were married without children,



while fifteen, or thirty-nine point four (39.4) percent, were married with children. Fourteen, or thirty-six point eight (36.8) percent, taught in inner-city schools, and twenty-four, or sixty-three point two (63.2) percent, were suburban teachers.

Analysis of the data according to the stated plan suggests the following:

In response to Rath's first criterion, "Do you choose freely to read?", item 1 of the survey questionnaire was used to generalize about teachers' responses. In this respect, the largest number of respondents listed their reasons for reading as being for recreation, professional development, and information about current events, and in that order.

In response to Rath's second criterion, "Do you choose reading from among alternatives (such as T.V., movies, cards, and so forth)?", item 12 of the survey questionnaire was used. Fourteen, or thirty-six point eight (36.8) percent indicated that they spent the major portion of their leisure time watching T.V., while eleven, or 28.9 percent chose to read. This finding is not unlike that reached by Mueller (1973) who determined that the teachers she studied placed a similar low value on reading as a leisure activity. It also represents a similar conclusion drawn from the work already mentioned in the reporting by Joseph and Polonsky (1981, p. 16). In their study, they indicated that elementary teachers spent most of their time watching T.V. as opposed to reading. In this study, as with the study above, teachers chose to watch T.V. because they said, "It freed them to do housework and other things at the same time."

In response to Rath's third criterion, "Do you choose reading thoughtfully with knowledge of the consequences of each alternative?", items 2 through 11 of the survey questionnaire were employed to generalize about possible teacher responses. According to the survey, most of the respondents read between three and four magazines per month while twenty-two, or fifty-seven point nine (57.9) percent read from one to ten books monthly. Nine, or twenty-three point seven (23.7) percent admitted to reading from eleven to twenty books monthly. Two male and one female said that they had read more than fifty books during the last six months, while only two respondents read as many as eight different magazines during the same time period.

Of the types of books read, short stories, language, books of fiction, books about sex, health and text books were chosen by more than eighty (80) percent of all surveyed. Closely following these choices were preferences for books relative to the social sciences, seventy-three point three (73.3) percent; The Bible, seventy-one (71) percent; mysteries, seventy-one (71) percent; autobiographies, seventy-one (71) percent; general references, seventy-one (71) percent; and books about history and geography, sixty-seven point five (67.5) percent. This would seem to concur with the possibility that teachers read to support their professional growth even during their leisure time, a conclusion also researched in a similar study of elementary teachers by Mour (1977).

The above data would suggest that teachers choose their reading with some concern for job related utility. While only fourteen, or thirty-six point eight (36.8) percent of the respondents admitted to spending as much as five or more hours for reading for pleasure per week, and eight, or twenty-one (21) percent said that they spent five hours or more for work related reading, there is little to suggest that teachers of elementary school children spend a great deal of time reading quality literature or professional books and magazines. While this sample was small, it seems difficult to conceive of only three teachers who regularly read either, *The Reading Teacher* or the *Journal of Reading*.

To respond to Rath's criterion, "Do you prize reading—hold it dear?", data generalized from the results of items 2 and 10 of the survey questionnaire were utilized. According to the information taken from these sections, only ten (10) percent of the teachers surveyed belonged to book clubs. The small number

together with the lack of membership in professional organizations related to reading offers little ground to declare that teachers in this study valued reading according to this specific criteria.

In response to Rath's fifth criterion, "Are you glad to be associated with it—do you publicly affirm your attitude towards reading?", data from items 5 and 10 of the questionnaire were used. This data also supported the conclusions reached in the fourth criterion discussion. Seventy-three point five (73.5) percent of those surveyed said that they read one or more professional magazines such as those from the NEA, but only three respondents mentioned reading either *The Reading Teacher* or the *Journal of Reading*. Five, or fourteen point eight (14.8) percent of the respondents named other professional magazines. Since membership in professional organizations is a form of public affirmation of an individual's beliefs and values, the respondents in this survey may be said to act in ways that do not affirm their love of reading.

Rath's sixth criterion, "Do you act out upon your choices, that is, do you fact read?", was answered using items 10 and 7 of the survey questionnaire. The respondents might well be said to read for factual acquisition. Again, the choices of books about health, text books, the preference for books about hobbies, the social sciences, history, geography, general information all indicate fact type reading. Almost eighty-nine (89) percent of those surveyed also read newspapers, local and nationwide.

Rath's final criterion, "Do you have a pattern of reading?", was answered by the data obtained from the entire survey questionnaire. The instrument readily lent itself to revealing such a pattern when the behavior of each respondent was viewed in relationship to the group. All respondents indicated a pattern of regular reading even though patterns of individual respondents differed.

The results of this study indicate that a high level of correlation may exist when the survey instrument's results are interpreted against the Rath (1966) paradigm for determining if teachers valued reading. While the survey instrument provides little information relative to the quality of what teachers commonly read, it does present evidence which suggest that socialization towards reading as one avenue of leisure time activity is evident in the lives of in-service educators.

That only twenty-eight point nine (28.9) percent of those surveyed in this study chosen reading as their preferred leisure activity concurs with the conclusion reached by similar researchers of the past. This finding is particularly disturbing when one considers that thirty-four, or eighty-nine point five (89.5) percent, listed "recreation" as their main purpose for reading. Where in-service and pre-service education is concerned, we might very well consider how this information should affect teacher training programs designed to improve the effectiveness of reading teachers.

It seems ludicrous to expect our school-aged children to develop life long habits of reading quality literature if their teachers in the early grades don't. After all, almost our entire plans for schooling depend heavily upon the powerful role of the teacher as model and chief socializer of the young. When teachers themselves do not read, it hardly seems likely that they will produce students who will.

Finally, the important role of literature, especially children's literature, in the appropriate socialization of our nation's youth is undeniable. Children, especially the poor and culturally different, still depend upon it as the only source whereby they can learn first hand of the curriculum of rules and regulations which govern our society (Jackson, 1968). If teachers of these youth show students by their action that they place a low value on this important medium, where else can we turn to assure improved national literacy and life long habits of reading among all of our people?

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### REACTION: READING HABITS AND PATTERNS OF IN-SERVICE READING TEACHERS IN PUBLIC AND PRIVATE SCHOOL SETTINGS

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Stanley Baker addresses an area that has long been a concern of reading specialists and teacher trainers, namely, what model of literacy do elementary classroom teachers provide for their students. Do teachers read?

In his attempt to measure reading behavior of elementary classroom teachers, Baker used a modified version of a questionnaire designed by Joseph and Polonsky and equated areas of response with Rath's valuing criteria. Unfortunately, Baker had difficulty in collecting data from his prospective one hundred twenty subjects. Only 31 percent of the sample returned completed questionnaires. Thus, from this small percentage of returns it would be difficult to generalize results to the larger population of elementary classroom teachers. One wonders why there was such a high rate of refusal to participate in the study and if, in fact, these teachers saw through the "indirectness" of the instrument and felt threatened.

A more complete description of the sample in terms of how the teachers were assigned practicum students might have explained teacher reluctance to participate in the study. Also worthy of consideration is the method by which the questionnaires were distributed. If practicum students approached supervising teachers with the Joseph and Polonsky instrument, did this bias teacher cooperation?

Disregarding the small percentage of subjects participating in data collection, one returns to the basic issue of what kind of a literacy model do teachers provide. Apparently, a high percentage of teachers do read for pleasure, meaning that they demonstrate a lifetime love of reading and as such should be modeling this behavior for students. The fact that a small percentage identified reading as a preferred leisure activity is not surprising and does concur with previous research as Baker notes. Since teachers are expected to model many attitudes and kinds of behaviors for students, should they be criticized for failing to select reading as the preferred behavior?

While a study of teacher responses to a values related reading questionnaire is interesting, it might be of more value to learn how teachers utilize reading and literature in their classrooms if we wish to theorize about the models they present and the attitudes they convey.

### THE STUDY AND READING NEEDS OF THE ELDERLY COLLEGE STUDENT

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Despite the fact that only a small percentage of those eligible take advantage of the opportunity, an increasing number of senior citizens are enrolling in college and university classes (Bader, 1977-78; Marcus, 1978). Generally those who take advantage of the programs tend to have higher economic and educational status than the typical older adult (Covey, 1980; Kingston, 1981; March, Hooper, Baum, 1977). Although many of the elderly who enroll in regular college and university classes had attended college years ago, there usually is noticeable time lag that must be overcome. In the State of Georgia, for example, the mean age of those attending state institutions under free special provisions, was 67.2 years (Kingston, 1981b). For many of these individuals their prior experience as college students had taken place 40 or more years before.

Not only do elderly college students have the long lapse of years as students to overcome, but age and maturity typically cause physical and psychological difficulties which serve to hamper academic adjustment. Visual and auditory problems are fairly common in persons 60 years or older. The older person needs greater light when reading or engaging in many "close vision" tasks required of the student. Fozard and Popkin (1978) note

The illumination required for satisfactory visual functioning increases with age primarily because of normal age changes in the amount of scattering of light in the ocular media, shrinking of the pupils, yellowing of the lens, and loss of accommodation. (p. 978)

In the Georgia sample, 93% of those responding indicated they had no difficulty seeing the chalkboard and 94% indicated they had no difficulty in seeing audiovisual displays or demonstrations. A number of respondents, however, indicated that they chose seats in the front of the classroom to assure seeing what went on. Unfortunately, there is limited information concerning the effect of visual changes on the reading and study tasks faced by elderly college students. Goodrow (1975) argues that

Poor vision was reported as the most serious constraint on the older American to reduce participation in adult learning programs. The barrier of declining visual acuity was found to be of primary concern with both male and female subjects. (p. 420)

Graney and Hayes (1976) also found that a number of elderly people felt that visual and auditory deprivation was a barrier to participation in educational programs. Considerable more research is needed in this area. In the Georgia study many more hearing difficulties were reported than visual difficulties. Although less than 17% of the elderly respondents said they sometimes had difficulty hearing the professors' lectures. Nearly 30% indicated that at times they encountered problems in hearing classroom discussions.

A number of psychological and mental factors also may affect the senior citizen's adjustment to the college classroom. For many elderly persons, the reasons for enrolling in classes is significantly different from those of younger students. Many are interested in being intellectually challenged, others are satisfying long-desired aspirations. The college teacher can err badly by assuming the motives of the elderly student are identical to those of the teenager or young adult. Similarly, it would be a grievous mistake to assume all senior citizens have similar motivations.

Age apparently affects the memory and learning of normal older individuals. A common problem is slowness in the retrieval of information and the blocking on names of people and places. Fozard and Popkin (1978) stress:



Age differences are most pronounced in tasks that involve the memorization of, and the accuracy and efficiency in retrieval of, unconventional configurations of familiar verbal material. (p. 981)

Although these conclusions are based upon traditional paired-associate and free-recall studies they probably apply to other verbal learning tasks as well. Studies involving the cloze procedure and discourse analysis techniques might throw some light on the relationship of this phenomenon to reading behavior.

There is some evidence that the older student may have difficulties in inputting and organizing data. Whether this condition is due to lack of familiarity and experience with such tasks or to the effects of age is not certain. It does seem clear, however, that many elderly people have difficulty in separating important and relevant information from that which is unimportant and irrelevant. Research suggests that there should be a slower presentation rate and that new concepts should be presented only after the elderly have had time to assimilate those concepts previously taught. Typically, the elderly fail to use mediation and organizing abilities to the same degree as the younger adult. The instructor needs to structure information so as to help facilitate learning and memory. Advanced organizers might be helpful.

Many noncognitive factors may cause performance deficits in the older student. Anxiety due to the newness of the situation in which the old person finds himself, the meaningfulness of the task and the degree of concentration required affect learning. It seems readily apparent that older people are willing to engage in tasks that they deem to be interesting and relevant, while refusing to interact with those they believe to be trivial, unimportant, or lacking in intrinsic value. Educators sometimes err in believing the older learner lacks the ability to learn when in actually he or she has simply lost interest in the task or activity.

A few writers, aware of the impact of age on learning, have suggested methods of instruction designed to assure greater success (Bolton, 1978; Glynn & Muth, 1979; Woodruff & Walsh, 1975). Interestingly, the college-adult reading specialist who should have much to offer, has devoted little attention as yet to the reading-study problems of the older student. Many of the skills being taught the typical college student undoubtedly would be helpful to the adjustment problems of the older adult. Reading instructors, for example, could assist the elderly student to become aware of, and to employ, various organization aids—glosses, italicized materials, and similar typographical aids. Considerable attention could be devoted to assisting the older student to learn how to sequence the organize textual material. Instead of reading selections followed by short answer objective tests, the elderly should be given a large amount of practice in outlining and summarizing textual passages and orally presented materials. Assistance also might help the elderly to develop objectives and purposes for learning. Techniques such as the survey, question, read, recite, review procedure may help the elderly student in better organizing textual material. Continued attention needs to be devoted to helping the elderly to be attentive and goal-directed. The older adult, just as the younger student, needs to be constantly reminded that learning is an active process that is best accomplished when the learner is attentive and has specific goals or objectives he or she hopes to attain and concentrates on achieving them. Again, the elder student needs to be taught procedures for systematic review.

Although the majority of college students today seem to prefer a textual reading mode that involves the underlining of selected passages with magic markers, this procedure probably is not as productive or helpful for the older adult. As note taking while reading requires the selection of important facts and principles, or generalizations as well as organization of concepts, ample practice in using these skills is desirable. Flexible reading, modes of comprehending, and vocabulary

improvement also would be valuable. Above all there is an urgent need for reliable and valid data concerning the reading behavior of the 60, 70, and 80 year old adult.

It has been estimated that there will be 25 million Americans aged 65 years or older by 1985. Undoubtedly, the number who enroll in institutions of higher learning will increase. Although college administrators have showed concern for the adjustment problems of many other segments of society, little has been done to study systematically the problems of the older student. Those involved in college reading and developmental study programs will find working with senior citizens a fertile field for service and research.

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#### READING ATTITUDES AND PROBLEMS OF THE ELDERLY

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In the United States the number of people 65 years of age or older is approximately 22 million, yet unfortunately little is known about their reading behavior (Kingston, 1973, 1979; Robinson and Maring, 1976). A phenomenon called "graying of the campus" has been noted since adult education programs have been booming recently throughout the nation. Reports from colleges during the last decade indicate a focus of attention on the educational and recreational needs of the elderly in the realm of higher education (De Carlo, 1974; Ellison, 1975; Stetar, 1974; Warner, 1974; Yarmon, 1980). It is therefore important for sponsors of these programs to have an understanding of the needs and attitudes of the elderly regarding reading.

As the majority of senior citizens have limited education and training in reading it is safe to assume that the elderly had adverse attitudes toward or difficulties in reading. This study was undertaken to identify some of the problems they indicated.

### Method

A group of 106 elderly adults (over 50 years of age) in the Chicago area participated in the study. The group consisted of 31 males and 75 females of all socio-economic levels and varying levels of education. Some were working, others retired or semi-retired. Some were homemakers with varying amounts of work experience. Included in the study were retired university faculty and staff, senior citizen group members, friends and neighbors.

Each was administered the Survey of Elderly Reading Attitudes (SERA) (Kingston, 1981). The inventory consisted of 75 items designed to elicit attitudes, recognition and comprehension problems, different reading behaviors and physical and psychological difficulties involved in reading. Each item consisted of a statement that the respondent was to either "Agree" or "Disagree" with by circling A or D. The percentage of "Agree" responses were calculated for the total group and subgroups by age, sex, and educational level.

### Results

The results were compiled for groups separated by sex, age, and years of education. In general there was evidence that females read better than males, the younger group read better and had fewer physical and psychological problems with reading than the older group. The better the educational level, the better the reading skills and attitudes. There was evidence of widespread recreational reading and survival reading skills for most adults.

Of the 106 participants in this study, 93% agreed to the statement, "I can read most advertisements without difficulty." Eighty-eight percent agreed to the statement, "When reading I get a mental picture of things about which I'm reading." These were followed by agreements of 87% for, "After reading a selection I can state the main idea in my own words"; 83% for the item, "I can read the newspaper without difficulty"; again 83% for, "I can recognize most of the words I read the instant I see them"; 82% for, "I have no trouble reading printed directions when I need to"; 81% for "I can understand the marks in the dictionary which explain how a word is pronounced"; 76% for, "After I read a passage I can recall most of the important facts and details I have read."

As indicated in Table 1, there was a disparity (61%) of responses to the statement, "Reading help me not to feel lonely," between the age group 50-59 years and the 80 and over age group, with only 27% of the former agreeing and 88% of the latter agreeing.

The next greatest difference was for the item, "I find my attention wanders when I read", with only 18% of the youngest group and 75% of the oldest group agreeing, another large difference (57%). The next item shows that as people grow older they are more likely to regard a day as wasted if they don't read for at least one hour. Although it may seem contradictory, this is followed by the item which indicates that older people read only when they have nothing else to do. Next is the response which indicated that the older people think they are above average readers for their group.

Table 1  
COMPARISON BY AGE GROUPS

| Item                                                           | Percentages |       |       |       |       |
|----------------------------------------------------------------|-------------|-------|-------|-------|-------|
|                                                                | 50-59       | 60-69 | 70-79 | 80-89 | Diff. |
| 15 Reading helps during loneliness                             | 27          | 62    | 81    | 88    | 61    |
| 4 Attention wanders while reading                              | 18          | 32    | 24    | 75    | 57    |
| 24 Regard day wasted if they don't read for at least 1 hr.     | 23          | 29    | 56    | 5     | 52    |
| 13 Read only when there's nothing else to do                   | 23          | 32    | 29    | 75    | 52    |
| 42 Recreational reading above average for age group            | 23          | 47    | 49    | 75    | 52    |
| 32 Frequently overlook words                                   | 14          | 35    | 32    | 63    | 49    |
| 61 Skip words they don't know                                  | 27          | 27    | 27    | 75    | 48    |
| 16 Don't like violent or sexy novels                           | 41          | 71    | 81    | 88    | 47    |
| 8 Print blurs after 15-20 minutes                              | 5           | 12    | 12    | 50    | 45    |
| 33 Frequently miss or reread a line                            | 18          | 21    | 44    | 63    | 45    |
| 51 Takes above average time to locate telephone number in book | 5           | 15    | 20    | 50    | 45    |
| 43 Often miss the point when reading                           | 5           | 15    | 17    | 50    | 45    |
| 36 Can recall most facts and details                           | 91          | 71    | 76    | 50    | 41    |
| 35 Self-conscious about reading aloud                          | 23          | 35    | 32    | 63    | 40    |
| 68 Friends and family interested in material read              | 64          | 41    | 54    | 25    | 39    |
| 37 Can paraphrase the main idea                                | 100         | 85    | 85    | 63    | 37    |
| 18 Reading has increased                                       | 27          | 41    | 73    | 63    | 36    |
| 20 Enjoy rereading stories read before                         | 27          | 24    | 49    | 63    | 36    |
| 21 Reading stories they didn't recognize before                | 14          | 27    | 34    | 50    | 36    |
| 50 Have a current library card                                 | 59          | 50    | 37    | 25    | 34    |
| 47 Have difficulty concentrating while reading                 | 5           | 21    | 32    | 38    | 33    |
| 62 Spell out words they don't know                             | 18          | 29    | 37    | 50    | 32    |
| 71 Read Bible more frequently than when younger                | 18          | 21    | 44    | 50    | 32    |
| 3 Do not read as widely as before                              | 32          | 47    | 39    | 63    | 31    |
| 1 Read more slowly than before                                 | 23          | 32    | 49    | 50    | 27    |
| 66 Read only when there's nothing better to do                 | 23          | 21    | 42    | 50    | 27    |
| 5 Read newspaper without difficulty                            | 100         | 79    | 81    | 75    | 25    |
| 6 Read advertisements without difficulty                       | 100         | 100   | 88    | 75    | 25    |



Other differences indicate that the oldest group frequently overlook words; more often skip words they don't know; don't like violent and sexy novels as much as the younger groups. The print often blurs for them after 15-20 minutes of reading; they take more time to locate a number in the telephone book; they have difficulty recalling the facts and details; they are more self-conscious about reading aloud. Their families and friends are less interested in what they read; they are less able to paraphrase the main ideas, they read more than they did when they were younger. The oldest group is also more likely to reread stories they have read before; they are less likely to have a current library card; they have greater difficulty concentrating; they tend to spell out words they don't know; they read the Bible more frequently; they read more widely; they read more slowly; and they have more difficulty reading newspapers and advertisements.

Comparison of responses of 31 males and 75 females where there is a disparity of 10% or more revealed the following types

of data. The greatest difference (32%) is for the item, "I can understand directions for filing tax returns without seeking help", 68% of the males responded "agree" while only 36% of the females responded "agree". This can be related to the image portrayed by the media and advertisements. Other responses indicate that in general males read fewer books, read less fiction, read slower than when younger, prefer larger type in newspapers, have difficulty reading print on glossy paper, don't get family or friends involved in what they read, don't prefer violent and sexy novels, don't subscribe to many magazines, often don't believe printed materials. In contrast, females usually read more books, read more fiction, don't read slower than when younger, don't have as much difficulty reading print on glossy paper, get family and friends involved in what they read, prefer violent and sexy novels, subscribe to more magazines, more often believe printed material.

Table 2 is a comparison of responses by educational level of the participants where there is a disparity of 25% or more.

Table 2

## COMPARISON BY YEARS OF EDUCATION

| Item                                                  | Percentage |       |     |       |
|-------------------------------------------------------|------------|-------|-----|-------|
|                                                       | 0-11       | 12-15 | 16+ | Diff. |
| 30 Often don't know words in newspapers               | 55         | 39    | 8   | 47    |
| 50 Have a current library card                        | 24         | 47    | 69  | 45    |
| 13 Read only when nothing else to do                  | 48         | 37    | 5   | 43    |
| 38 Say most published material not worth reading      | 69         | 43    | 26  | 43    |
| 35 Self-conscious about reading aloud                 | 59         | 24    | 22  | 37    |
| 61 Skip unfamiliar words                              | 45         | 31    | 9   | 36    |
| 40 Can understand directions of tax returns           | 31         | 43    | 66  | 35    |
| 7 Can read governmental forms                         | 31         | 61    | 65  | 34    |
| 32 Frequently overlook words                          | 52         | 28    | 18  | 34    |
| 66 Read only when nothing better to do                | 41         | 37    | 8   | 33    |
| 64 Read all material at same rate                     | 55         | 39    | 22  | 33    |
| 49 Know how to use library card catalog               | 59         | 61    | 92  | 33    |
| 27 Subscribe to daily newspaper                       | 51         | 49    | 83  | 32    |
| 4 Attention wanders while reading                     | 51         | 20    | 26  | 31    |
| 33 Frequently miss or reread a line                   | 48         | 31    | 18  | 30    |
| 60 Can understand dictionary pronunciation key        | 66         | 84    | 95  | 29    |
| 43 Often miss the point of material                   | 28         | 18    | 0   | 28    |
| 16 Don't read violent or sexy novels                  | 79         | 73    | 52  | 27    |
| 36 Can recall facts and details                       | 66         | 73    | 92  | 26    |
| 51 Difficulty in locating number in telephone book    | 31         | 16    | 5   | 26    |
| 62 Spell out unfamiliar words                         | 48         | 26    | 22  | 26    |
| 53 Subscribe to two or more magazines                 | 48         | 67    | 74  | 26    |
| 68 Friends and family are interested in their reading | 35         | 49    | 61  | 26    |
| 21 Read stories that were not recognized at first     | 38         | 28    | 13  | 25    |
| 28 Go to public library at least once a month         | 14         | 22    | 39  | 25    |

The greatest difference was for the item, "I often find words in the newspapers whose meaning I don't know." This was agreed to by 55% of the less educated, those with 0-11 years of education and only 8% of the most educated group with 16 or more years of education.

### Discussion

The results of this study suggest that most of the mature adults who filled out the inventory considered themselves good readers. The statements with the highest percentage of agreement were all very positive in nature and indicated no difficulty in reading or understanding a variety of the usual types of materials such as newspapers, advertisements, and directions. When the group was divided into subgroups, however,

on the basis of age, sex, and educational levels, it was found that there were some very great differences among these older people.

When the elderly are separated into ten-year age groups, starting at fifty years of age and above, there were twenty-eight items in which the difference between the youngest and the oldest group studied were twenty-five percent or greater. These differences have important implications and offer insight for the teacher, counselor, and administrator. There were larger differences between the age groups than between the sexes or educational levels. The greatest difference between the youngest and oldest group was sixty-one percentage points for the item, "Reading helps me not to feel lonely." It may be that the younger group have more friends, activities and are more

likely to have a marriage partner.

The findings for the age groups further indicate that in general, reading skills such as understanding the main idea, remembering the important facts, skimming and scanning, general comprehension, rate and concentration, all diminish with age. Reading is also a means of overcoming loneliness, and filling idle-time, a form of recreation and relaxation. One may also conclude from these findings that vision and the cognitive processes are also declining for most elderly subjects, also that the main differential in reading habits of the elderly is age followed by educational level, then by sex.

Another finding was that there were twenty-four items with 10% or more differences between male and female responses. It was also apparent that although these differences were important, they were not as great nor as many as the differences between age or education. The greatest difference between males and females was thirty-two percentage points for the item, "I can understand directions for filing tax returns without seeking help", which may reflect an experience factor.

These findings also indicate that females read more than males, especially fictional material and magazines, they appear to be more facile readers. They use the library more frequently and are more knowledgeable about the library and reference material than males. This is in keeping with the literature and may be due partly to the fact that they have spent more time in libraries and reading recreational material than males who generally spend more time in their occupations. An unexpected finding was that females preferred violent or sexy novels more than males.

A final finding was in the differences noted between respondents according to educational levels. It was found that there were twenty-five items with a difference of at least 25 percentage points between highest and lowest educational levels. The greatest difference was forty-seven percentage points, which was for the item, "I often find words in the newspaper whose meaning I don't know."

The findings corroborate what one might expect—that more education contributes to a better vocabulary, better reading habits and improved study skills. It also results in more and better skill in the use of library facilities, broader reading interests and greater reading flexibility. We may conclude that reading contributes more to the educational and recreational accomplishments of the aged who are better educated than to those with less schooling.

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#### TRAINING ADMINISTRATORS IN THE SUPERVISION OF CONTENT AREA READING TEACHERS

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This paper is one of a series of three presented at the second annual conference of the American Reading Forum. It examined eight premises for the training of administrators in the clinical supervision of content area teachers and is based upon five workshops offered in a Pennsylvania school district as part of the Content Area Reading Program (CARP).

While the primary focus of the Content Area Program, supported by an ESEA Title IVc grant, was a series of workshops designed for content teachers of grades 4 through 10, administrative personnel were trained in clinical supervision and systematic observation. This training was designed to help supervisors and administrators facilitate the implementation of CARP objectives by content teachers. While participating in the five half-day workshops, the seven principals, two teachers, and five administrators generated observation instruments that could be used in content classrooms.

A model, the Instructional Supervision Process, developed by Boyan and Copeland (1978) was adapted for use with project administrators. The model, grounded in the belief that the supervision process must be based upon a collegial supervisor-teacher relationship, is designed to facilitate teacher self-improvement. Rather than a model for teacher evaluation, it is a practical model for face-to-face clinical supervision. Eight premises, crucial to such a model, guided the design and implementation of the five workshops. These eight premises form the body of this paper.

*Many problems encountered in the content classroom can be resolved if the teacher changes his or her behavior in positive ways.* Content teachers, frustrated with an ever increasing number of factors over which they have no control, often fail to recognize the influence of their behavior on the actions of students. Peer group pressure, experiential background, reading ability, preconceptions, home environment, and physical characteristics have a tremendous influence on students' classroom behavior and remain beyond the control of the content area teacher. However, the teacher does have control of his or her own behavior. In effect, many difficulties encountered as content teachers attempt to incorporate the teaching of reading skills into their content field, can be overcome by a change in teaching behavior. The content teacher's behavior is the instructional factor which the teacher can come to know best and over which the teacher can exercise the most control.

*Recognition of needed change in behavior must come from within, not be imposed from without.* Supervisors and administrators have traditionally had difficulty in addressing the need for change. The content teacher will not quickly integrate the teaching of reading skills into his or her content area if it is imposed by an administrator or supervisor. Commitment to change in behavior must be personally felt and must be affirmed for its worth. This is especially true for the insecure content teacher or the content teacher skeptical of the role of reading skill development in his or her content classroom.

*Content teachers are often unaware of many teaching and learning behaviors which occur in their classrooms.* Jackson (1968) illustrated that even good teachers, when interviewed,



express unawareness of some of their classroom behaviors and are upset by their inability to monitor their behavior. Three reasons seem to account for this lack of awareness: too much happens too rapidly in the classroom, teachers are seldom equipped with the specific skills necessary for labeling classroom behavior, and it is too difficult to systematically observe while teaching. The content teacher, primarily concerned with management, evaluation of student responses, and communicating content material, is seldom able to effectively monitor his or her own behavior.

Differential treatment of high- and low-achieving students is an area where this unawareness is common in content classrooms. Rowe (1969) and Brophy and Good (1970) found through systematic observation that teachers gave up on low-achieving students who had difficulty responding to questions. However, at the time they gave up on the students, the teachers did not consider this to be giving up. Expressing embarrassment over the silence and assuming that the low-achieving students were also embarrassed, the teachers rushed forward to keep the discussion rolling. Teachers were giving low-achieving students less time to respond and thereby making a response more difficult. All of this took place without the teachers being aware of their behavior.

*Increased awareness of teaching and learning behaviors in the classroom can help content teachers recognize needed changes.* While much inappropriate teaching occurs because teachers are unaware of their behavior, when given specific information, teachers use that information to change their behavior and improve instruction. This is especially true if the teachers' participation is voluntary. Pambookian (1976), McNeil (1971), and Martin (1973) have shown that teachers are most likely to change when provided with information that shows a discrepancy between what they want to do and what they are doing. The goal of integrating the teaching of reading skills into the content classroom must be important to the content teacher. If the teacher finds that attention to reading skills and the reading process helps the child master the content, change is possible. In a similar manner, if a supervisor can help the content teacher identify teaching behaviors which actually inhibit the child's ability to read and understand content material, change is possible.

*Existing teaching and learning behaviors can be revealed to the content teacher through systematic observation.* To alter the content teacher's behavior, that teacher must be able to see what is taking place in the classroom. While observation does not automatically improve instruction, when conducted by competent persons who have a systematic method for looking into classrooms, content teachers can receive the type of feedback which can improve instruction. Eash and Rasher (1977) illustrate that an inservice program can be aided by classroom observation when the observation is specific and revolves around behavior that is of interest to the teachers.

*Because it is difficult for the content teacher to apply systematic observation techniques while teaching, a trained observer is needed.* Typically teachers receive information about what occurs in the classroom in a limited number of ways: student generated feedback, peer observation, self-evaluation, videotaping, and observation by a supervisor or administrator. While student feedback is useful, children are unable to objectively and systematically observe the complex interactions that occur in a classroom.

Peer observation is threatening to most teachers and presupposes that fellow teachers have both the time and the observation skills required for systematic observation. While videotaping seems to be an ideal way for teachers to objectively observe classroom interaction, the research indicates that it is effective only if specific teaching behaviors are highlighted and discussed (Fuller and Manning, 1973; Peck, 1971; Baker, 1970). Unless the content teachers know what to look for and

how to observe, they are unlikely to see very much. The behavior revealed through videotaping is just as rapid and complex.

Self-evaluation is equally difficult. Teachers, as has been illustrated, are too involved in the teaching process to think about what they are doing. They have little training in systematic observation and are frequently unaware of their own behavior. While students, peers, videotapes, and self-analyses are potentially useful to a teacher, the trained observer is the logical source for information regarding classroom behavior.

*The observer must present the observation results to the content teacher in a way that will allow the teacher to accept them as valid, to internalize them, and to use them to identify needed instructional changes.* The traditional subjective and evaluation-laden process of supervision frequently prevents content teachers from accepting and internalizing observation results. While the literature in supervision over the last two decades has advocated a collegial supervisor-teacher relationship and has identified equal participation by the teacher as a crucial factor in the supervision process (Cogan, 1972; Goldhammer, 1969; Sergiovanni and Starratt, 1979), the research also indicates that teachers often perceive themselves as ignored subordinates. Walker (1976), in a survey of 113 Georgia teachers, found that teachers perceived supervisors as having little respect for teachers' opinions. Supervisors were also seen as unavailable to teachers, deficient in listening skills, and unconcerned for individual differences.

The research has revealed that teachers generally perceive the supervisor as either threatening and authoritarian or a nonentity and out of touch with classroom reality. Heald (1969) notes a comprehensive study conducted by the National Education Association (NEA) which is representative of this research. The NEA study, published in 1964, involved 600 superintendents, 800 principals, and 1000 teachers. While the supervisors perceived evaluation as valuable for the improvement of instruction, over one-half of the teachers reported that the written evaluations of their work resulted in no observable changes in behavior.

The NEA survey further reported that superintendents were the most confident of the capacity of evaluation programs to improve the quality of teaching, but teachers were the least confident. The percentage of principals who believed that evaluation programs stimulated teachers to improve instruction was nearly twice as high as the percentage of teachers who believed that improvements followed evaluation. When teachers perceive the supervisor and the supervision process to be ineffectual, it is unlikely that they will internalize the results of observation data.

*The teacher will accept and internalize observation results best when there is a "no threat" relationship between the teacher and the supervisor.* The discrepancy between teachers' perceptions of the supervision process and those of administrators is due, in part, to the threat generated by a supervisor in an evaluative role. Withholding tenure or dismissing a tenured teacher may be infrequent personnel actions but they become involved in the teachers' view of a principal or supervisor. There is a critical and obvious conflict between the evaluation of teachers on the one hand and stimulating professional growth on the other. Differentiating supervision to improve instruction from administration and evaluation presents a significant challenge to supervisors of content teachers.

Cogan (1976) suggests that most of what is today called supervision is heavily weighted toward general supervision, the administration of supervision, and the rating of teachers. Babcock (1965), stating the generally held view of the Association for Supervision and Curriculum Development (ASCD), suggests that this view must change. He describes supervision as a service rather than an administrative function. "We have long recognized that the supervision of instruction in the classroom

should be removed from the 'authority' role. It should be removed as far as possible from the 'line-staff' relationship."

While Cogan (1976) concedes that public school supervisors are frequently charged with the responsibility for the management of programs and the rating of teachers, he contends that these roles appear to hold so much threat that it "deforms the supervisor's relationship with the teacher." The confusion of the management and rating roles with the improvement of instruction role is due to the distribution of supervisory functions among administrators and teachers and the acceptance of administrative functions by supervisors (Lucio and McNeil, 1979).

In an editorial, Unruh (1977) urges that supervision is at "a critical moment in history." Supervisors, she contends, must either rise to the challenge of leadership or lose their function to other individuals or agencies. If Unruh is correct, supervisors may begin to meet this challenge by differentiating the roles of evaluator and supervisor. The workshops conducted for Content Area Reading Program administrators were built upon the preceding premises and focused on face-to-face encounters. The role of the supervisor is not that of an evaluator. The content area teacher performs a central role in this type of supervision. Supervision becomes something that is done together; content teacher and supervisor share the expert role.

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#### RESEARCH RESULTS: TEACHER CHANGE IN CONTENT AREA READING

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As described in the preceding paper by Laine, the Content Area Reading Program (CARP) has been operating through a statewide network of instructors in Pennsylvania. Because we have advocated long-term involvement as the most effective inservice education effort, we welcomed the opportunity to work with the Hollidaysburg (Pennsylvania) Area School District for a three year period (1979-82) under Title IVc funding.

The first year of training involved 25 teachers, Grades 4-10, who taught various content area subjects. Several reading specialists were included in the group. Each month two three-hour workshops were conducted. The first workshop (dubbed the "theory" workshop by the participants) was presented by one of the authors concerning two or more of the topics included in the CARP curriculum. The second workshop of the month provided work time for the teachers to apply the workshop content to their own classrooms. The reading supervisor conducted the "application" workshops with the help of the reading specialists. She also worked with the content teachers in their classrooms, helping them to apply content area reading strategies. Laine, then as a graduate student, attended both types of workshops for teachers as well as conducted the workshops for administrators, providing the coordination among inservice efforts for the various school personnel. An optional summer workshop for teachers followed, conducted by the reading supervisor to provide additional time for materials development. A dissemination book was prepared consisting of samples of the work created by the teachers involved in the first year of training.

During the second year we again delivered the CARP curriculum to different content area teachers. The reading supervisor provided the main linkage between the "theory" and "application" workshops. The content teachers and reading specialists who participated during the first year attended some of the "application" workshops to do further materials development and serve as resources to the second-year teachers. The reading supervisor again helped the content area teachers apply what they were learning in the workshops in their classrooms.

Due to a cutback in Title IVc funding, the design for the third year had to be modified. Science and social studies teachers at the high school participated with both the "theory" and "application" workshops being conducted by the reading supervisor. The reading specialists assisted, serving as resource personnel to the content teachers. While cutbacks in funding



usually do not have positive effects, in this instance we believe it may have since responsibility for the inservice education in content area reading now belongs completely to the school district. The CARP curriculum is still being implemented, but university personnel have been phased out.

The project has also included a research effort which is described in the next section.

### Project Evaluation

Initial comparisons involved the first-year workshop teachers and all other teachers in the school district, Grades 4-10. All teachers were tested at the beginning and end of the school year with two measures of attitude toward teaching reading in the content areas as well as a criterion-referenced test of knowledge of reading skills. The instruments, which are described in more detail elsewhere (Dupuis & Askov, 1977), are briefly summarized.

The first attitude instrument, the *Statements Survey*, is a twenty-item Likert scale that yields a direct measure of teacher attitude toward incorporating reading instruction in the content areas and has an estimated reliability (coefficient alpha) of .85.

A second instrument, the *Situations Survey*, is a less direct measure of teacher attitude toward content area reading instruction. This instrument, which utilizes the semantic differential technique, consists of twelve items with five sets of bipolar adjectives (such as *practical-impractical*) to be rated for each item. Each item consists of a classroom situation that a content area teacher might face and a possible diagnostic-prescriptive plan the teacher might follow in the situation

described. This instrument has an estimated reliability (coefficient alpha) of .94.

Two questions using the semantic differential format and included as part of the *Situations Survey* yield two additional scores used in assessing the effects of the inservice program. The first of these scores, the Feasibility score (estimated reliability, coefficient alpha, of .86), is obtained from teacher ratings of the bipolar adjectives *feasible-not feasible* after each of the twelve items on the *Situations Survey*. This score was considered a third dimension of attitude in analyzing results.

The other score obtained from this instrument is a self-report measure consisting of teacher ratings of the bipolar adjectives *skilled-not skilled* after each of the twelve items on the *Situations Survey*. This Perceived Skill score (estimated test-result reliability of .93) was designed to measure a teacher's confidence in implementing the stated diagnostic-prescriptive plan.

To measure the cognitive aspects of the program, a knowledge-level criterion-referenced instrument was developed based on the specified required written objectives each inservice participant was expected to complete. The thirty-four item *Knowledge of Reading Skills Test* has an estimated reliability (KR-20) of .76.

### Results and Discussion

Analyses of variance were performed on the difference scores between the pretests and posttests for both groups (workshop teachers vs. other teachers). These results are presented in Tables 1 and 2.

Table 1  
PRE- AND POSTTEST OBSERVED MEAN SCORES

|                                               | Experimental     |          | Comparison       |          |
|-----------------------------------------------|------------------|----------|------------------|----------|
|                                               | Pretest          | Posttest | Pretest          | Posttest |
| Knowledge of Reading<br>(Multiple Choice)     | 16.69<br>(N=16)  | 21.44    | 13.15<br>(N=73)  | 13.41    |
| Statements Survey (Likert)                    | 90.35<br>(N=17)  | 96.00    | 82.67<br>(N=73)  | 80.93    |
| Situations Survey:<br>(Semantic Differential) |                  |          |                  |          |
| Reaction to Situations                        | 378.69           | 409.31   | 352.31           | 352.75   |
| Feasibility                                   | 68.88            | 79.88    | 67.73            | 68.17    |
| Perceived Skill                               | 68.38            | 78.25    | 63.53            | 62.38    |
| Total                                         | 516.94<br>(N=16) | 567.44   | 483.58<br>(N=64) | 483.30   |

**Table 2**  
**ANALYSIS OF VARIANCE, TREATMENT  $\times$  TIME**

|                        | <u>df</u> | <u>MS</u> | <u>F</u> |
|------------------------|-----------|-----------|----------|
| Knowledge of Reading:  |           |           |          |
| Treatment              | 1         | 264.54    | 19.62*** |
| Error                  | 87        | 13.48     |          |
| Statements Survey:     |           |           |          |
| Treatment              | 1         | 752.39    | 9.55**   |
| Error                  | 88        | 78.82     |          |
| Situations Survey:     |           |           |          |
| Reaction to Situations |           |           |          |
| Treatment              | 1         | 11664.00  | 5.83*    |
| Error                  | 78        | 2000.00   |          |
| Feasibility            |           |           |          |
| Treatment              | 1         | 1428.05   | 21.32*** |
| Error                  | 78        | 66.97     |          |
| Perceived Skill        |           |           |          |
| Treatment              | 1         | 1557.60   | 8.83**   |
| Error                  | 78        | 176.30    |          |
| Total                  |           |           |          |
| Treatment              | 1         | 34321.00  | 10.379** |
| Error                  | 78        | 3307.00   |          |

\*p = .05

\*\*p = .01

\*\*\*p = .001

As can be seen, the teachers involved in the workshops gained significantly in their attitudes toward content area reading instruction and in their knowledge of reading skills and techniques. The comparison group remained essentially similar on both administrations.

It must also be noted that the first year workshop teachers scored higher on the pretest for all measures except the Situations Feasibility and Perceived Skill scores. In other words, they seemed to have felt more positive toward content area reading instruction and appeared to know more about it. However, they felt no more certain about the feasibility of actual implementation in their classrooms nor more confident in their own abilities to do so. Since they volunteered for participation in the workshops, while the comparison group did not volunteer even for testing, it is not surprising that their initial scores were

higher. Differences between the two groups on the pretests were not found in the original CARP data (Dupuis and Askov, 1977), probably because the comparison group consisted of volunteers (for testing only) rather than a whole school faculty as was the case in Hollidaysburg.

As a further check on the validity of inservice training for the first year teachers, we observed their classes during the spring of the second year of the project. We believed that by then the teachers had had adequate time to implement content area reading strategies. We were satisfied that CARP objectives were being implemented in the classrooms observed.

#### Conclusions

Long-term involvement in inservice training in content area reading does improve not only knowledge of reading skills but



of the reading act itself. As an added advantage, word associations do not require reading ability. What they do require, however, is an accounting for how information is processed and for qualitative levels of response.

Dinnan, Cowart, and Bickley (1971) have designed a workable schemata for the classification of responses as either paradigmatic or syntagmatic. The schema is based on the products of intellectual operations posited by Guilford (1967). McNinch, Hornby, and Richmond (1971) have shown that paradigmatic or syntagmatic responses are facets of verbal fluency and abstract problem-solving abilities. Different groups of students reflect highly significant differences on measures involving language or intellectual processes. The results of these studies have shown a high degree of relationship between paradigmatic responses and academic achievement (Bickley, Dinnan & Bickley, 1970; Dinnan, Cowart & Bickley, 1971; Dinnan, 1973; Dinnan, 1971; Crable, 1975; Lamarre, 1976; Cartelli, 1980.) Dinnan (1975) has suggested that a major emphasis in early schooling should be placed on word association and word frequency findings. Using data from research in word frequency, he has identified and compared 110 prime frequency words in five languages. The order of appearance is virtually identical across the five languages. Singularly noteworthy is that these 110 words comprise 50% of all communications in either spoken or written forms (Dinnan & Lodge, 1976.) Furthermore, the common element appearing in the 110 prime frequencies is that of base references to time, space, and amount.

### Purpose

It was the purpose of this investigation to explore the main effects of paradigmatic language training on (three groups) childrens' comprehension of oral language perceptions and performance scores on educational subtests in the areas of gross motor, fine motor, concepts, and communication. The following null hypotheses were formulated and evaluated for statistical significance at the .01 level:

H<sub>1</sub>. Treatment time will not effect differences between Group (0, 1, 2) means of childrens' comprehension of oral language perceptions.

H<sub>2</sub>. Treatment time will not effect differences between Group (0, 1, 2) means of childrens' performance scores on educational subtest tasks.

H<sub>3</sub>. There will be no significant, positive correlation between paradigmatic language training and each criterion variable.

### Subjects

The subjects in this study consisted of five classes (N = 83) of preschool children enrolled in a full-time, local Head Start Program. Classes were randomly divided into three groups for experimental purposes. Group 0 consisted of two classes of children (N = 35, X age = 4.1) who received no (0 minutes per day) special language training; Group 1 consisted of one class of children (N = 16, X age = 4.0) who received one, 20-30 minute special training session each day; Group 2 consisted of two classes of children (N = 32, X age = 4.1) who received two sessions (20-30 minutes each) of special language training per day.

### Procedures

All children in this study were given pretests on the two criterion measures that would be used in the final analysis of the data. The *Paradigmatic/Syntagmatic Oral Language Inventory (P/S Inventory)* (Dinnan, 1971, Form A) and the *Developmental Indicators for the Assessment of Learning (DIAL)* (Mardell & Goldenberg, 1975, Subtests: Gross Motor, Fine Motor, Concepts, and Communication). Pretest data were subjected to a One Way ANOVA for each criterion variable. Each subtest of the DIAL is an independent evaluation and, therefore, was treated as a separate criterion. Results indicate that at the .01 level of confidence, the only statistically significant *F* ratio was for the Gross Motor Subtest ( $F = .0145$ ). All other comparisons were not significant, and the Groups (except in the area of Gross Motor) were initially equal prior to training.

### Training

Teachers and aides in Groups 1 and 2 were given one week of intensive, preservice on the implementation and methodology of paradigmatic language training. Training in paradigmatic language structures, as the oral language curriculum, was initiated approximately one month later after new children had settled down and adjusted to being in school and pretest data had been collected.

The training program was based on the sequential and structured lessons presented in the *Key to Learning Series, Kit 1* (Dinnan & Cowart, 1976). Training in comprehension of oral language perceptions focused on getting children to process information through relations and then group the products into classes and major systems. The prime frequency words (110 frequency) were presented (orally) in contrast sets to establish this awareness. These relational referents lend themselves to demonstration and can easily be taught through the use of varied objects, pictures, etc., found in any classroom. The object of oral language training was to bring the children to the point where they could automatically contrast responses as found in the general language community. Children were also taught the basic referent pairs (25) which are considered minimal before entry into reading could be initiated. Special language training was conducted daily through the entire school year (approximately 8 months). Posttesting on criterion measures was conducted for all Groups during the month of April of the same school year.

### Results and Findings

Since the results of pretest findings showed some degree of significance (Training X Gross Motor), a Pearson Product-Moment Correlation was run between the independent and dependent variables (Training X each criterion measure) to determine the degree of relationship that existed. The results are as follows: Training X a) *P/S Inventory*,  $r = .7277$ ,  $p < .001$ ; b) *DIAL Gross Motor*,  $r = .1786$ ,  $p = .053$ ; c) *DIAL Fine Motor*,  $r = .3330$ ,  $p = .001$ ; d) *DIAL Concepts*,  $r = .3718$ ,  $p = .001$ ; 3) *Communication*,  $r = .3288$ ,  $p < .001$ . These findings indicate that a high, positive relationship exists between paradigmatic language training and performance scores on the *P/S Inventory* and moderate (but statistically significant) relationship exists with all other criterion measures. In light of these findings, an Analysis of Covariance (ANCOVA) was the statistical instrument used to analyze the posttest data. Pretests were used as the covariate (control variable) so as not to confound the real differences in Group means after treatment. Scheffe aftertests were also

used in the comparison of Group means to determine more precisely which difference between means contributed to the significance.

Table 1 shows a summary of the posttest results of the effects of treatment in relation to each criterion variable. An overview of this Table supports the following findings in relation to each null hypothesis.

Treatment time will not effect differences between Group (0, 1, 2) means of childrens' comprehension of oral language perceptions was the first hypothesis. Table 1 shows that treatment was significantly related to childrens' comprehension of oral language perceptions. Children who received paradigmatic language training in Groups 1 and 2, performed significantly better on the *P/S Inventory* than those children who received 0 minutes of training. Sixty-seven percent of the variance in paradigmatic language responding can be accounted for by knowing to which Group (0, 1, or 2) children were assigned. Therefore, the null hypothesis is rejected.

Table 1  
ANCOVA For The Main Effects of Training By Performance Scores On Criterion Measures

| Criterion          | SS       | df | (Between) |         | eta | Variance |
|--------------------|----------|----|-----------|---------|-----|----------|
|                    |          |    | MS        | F       |     |          |
| P/S Inventory      | 3197.875 | 2  | 1598.937  | 54.018* | .82 | 67%      |
| DIAL Gross Motor   | 31.850   | 2  | 15.925    | 10.089* | .54 | 29%      |
| DIAL Fine Motor    | 70.995   | 2  | 35.497    | 17.263* | .63 | 40%      |
| DIAL Concepts      | 82.533   | 2  | 41.267    | 22.743* | .68 | 46%      |
| DIAL Communication | 87.987   | 2  | 43.993    | 23.344* | .69 | 48%      |

p .001

Treatment time will not effect differences between Group (0, 1, 2) means of childrens' performance scores on educational subtest tasks was the second hypothesis. Table 1 shows that treatment time was significantly related to childrens' performance scores on each of the four subtests of the *DIAL*. Children who received some special training, (both Groups 1 or 2) performed significantly better on educational subtests than those who received no training (Group 0). Anywhere from 30% to 48% of the variance in educational subtest scores can be accounted for by knowing to which treatment group children were assigned. The null hypothesis is therefore rejected.

There will be no significant, positive correlation between paradigmatic language training and each criterion variable, was the third hypothesis. As mentioned above, the findings derived from a Pearson Product-Moment Correlation did reveal that training was significantly related to each criterion variable. The associations are moderately to highly significant and are all positive. Apparently, paradigmatic language training is a reliable predictor of childrens' performance on educational measurements.

Although all analyses of the data reveal significant differences between Group means, it was not known what Group differences were contributing to the significance; therefore, Scheffe Multiple Range Aftertests were used to analyze Group (0, 1, 2) means. The differences in treatment time were significantly different from group means for the *P/S Inventory*. Comparisons show that Group 2 (who received two daily sessions) performed significantly better ( $p < .001$ ) than Group 1 (who received one daily session). Also, Group 1 performed significantly better than Group 0, who received no

special training. These results are not surprising in light of the findings of the ANCOVA and Pearson Correlation. When comparisons were made for differences between Group means on the performance scores of the *DIAL* subtests, significant Group differences were obtained ( $p < .01$ ) between Group 2 and Group 0 for each subtest variable. Apparently, the quantity of treatment time was a key factor in obtaining significant differences in Group mean performance. The more paradigmatic language training children received, the greater the difference between means.

### Discussion

The primary goal of a good oral language program is to transmit to children the necessary prerequisite skills necessary for reading readiness. As Shipman (1972) discovered in his analysis of longitudinal data for 18,000 Head Start children, *comprehension* of language does not seem to be the obstacle, it is the *use* of language for communication and performance

purposes that these children failed to make gains. Perhaps, this is one reason why despite the increased attention and funding to provide quality, education programs for Head Start children, they may still fail to make substantial academic gains to succeed in school. The content of the language program must be very carefully analyzed in relation to priority objectives and skills children must have to be even mildly competitive in school.

This study suggests that paradigmatic language training *can* provide children at the preschool level with a sound oral language foundation on which to build reading skills. There is substantial, significant research that supports the paradigmatic/syntagmatic criterion for the classification of associative responses and the desirability of using verbal associations as predictors of reading performance. Despite earlier research (Entwistle, 1966) which showed that children did not make the paradigmatic/syntagmatic shift until they were of school age, we are finding out that children before the age of five or six can readily be taught to operate in a paradigmatic framework before they get to school. Educators can no longer assume that children will use language to express common relationships and communicate ideas. Intervention must take place now when we can make a real difference and guide children through the mastery of the oral language code. Only then can we be sure that we have given our preschoolers a real Head Start!



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**WORD READING EFFICIENCY OF DISABLED  
READERS UNDER CONDITIONS OF  
SEMANTIC LOADING WITH IMPLICATIONS FOR  
READING COMPREHENSION**

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In 1962 Quillian proposed a "spreading activation" theory originally intended for computer simulation but which has since been used to attempt explanation of storage and retrieval of familiar semantic information (Collins & Loftus). This theory posits development and storage of concept nodes.

Such nodes are considered to be made up of a network of related pieces of information described by labels or words. These words or labels are related to the node label or *superset* (Collins & Quillian).

For example, the superset (label/word) *canary* has properties (or pieces of information) such as *is yellow* and *can sing* (Collins & Quillian). The word used to label the node (superset) together with its constituent properties (also labeled by words) is thought to make up a concept. Semantic memory, then, is assumed to consist of a series of inter-related nodes. That is, individual nodes would be related through various relational elements to other nodes (Collins & Loftus). As described by Pearson and Johnson (1978) a network of inter-related nodes make up a semantic map for a given entity.

A priming of a given node and related linkages occurs when a stimulus word activates all its semantically-related node and related linkages, including those to other nodes. Therefore "... priming a node such as *red* will prime the links involving the relation 'color' throughout the network" (Collins & Loftus, p. 409). Priming a network would be analogous to the excitation of an electrical circuit: The "power is on" and ready for utilization. For example, a subject's response time will be less to pronounce word sets like *bank, school, church, store* than will be the amount of time required to retrieve semantically-unrelated words such as *seven, may, over, school*. The time required to make a response is affected by the semantic context (Meyer & Schvaneveldt, 1970). Such a model is testable. If valid, then information ought to be retrieved more effectively—either in greater or more selective quantity and/or more quickly.

Semantically and randomly aired words, categorized word lists for free recall and for word pronunciation tasks, and sets of sentences requiring lexical decisions have been used to test priming and network theories (Collins & Quillian, 1969; Bower, Clark, Lesgold & Winzenz, 1969; Meyer & Schvaneveldt, 1971, 1976; Forbach, Stanners & Hochhaus, 1974; Neely, 1977; Cohene, Smith & Klein, 1978; Stuart, 1979). However, studies of the priming/spreading activation model tend to have used young adults as test subjects. But these studies do give general support to the spreading activation thesis.

How information is stored and retrieved is integral to accessing meaning. And, of course, accessing meaning is central to reading comprehension. If semantic loading—or priming—does decrease response time in free recall or pronunciation tasks for young adults, would younger subjects (i.e., elementary school children) respond in like manner? If so, then techniques for teaching reading may be aided accordingly, especially for remedial reading instruction. Therefore, the question posed by this study is: What effects will semantic loading have on the word-pronunciation ability of disabled fifth-grade readers?

## METHOD

### Subjects

The subjects were 23 fifth-grade pupils drawn from a suburban school district in southern Mississippi. Subjects were drawn randomly from the total population of disabled fifth-grade readers in the co-operating school. Poor readers were selected for the study to avoid automaticity (LaBerge & Samuels) of response in the pronunciation task. In addition it was thought that disabled readers' performance would yield a scatter of pronunciation errors to analyze.

The mean total grade-level equivalence as measured on the comprehensive Test of Basic Skills (CTBS) was 4.3. Scores

obtained from giving the *Peabody Picture Vocabulary Test* yielded a mean of 87. The subjects were assigned to one of three groups, based upon vocabulary and comprehension subtest scores from the CTBS. The three groups consisted of (1) subjects whose vocabulary scores were superior to their comprehension scores, (2) subjects whose comprehension scores were superior to their vocabulary scores, and (3) subjects whose vocabulary scores were equal to their comprehension subtest scores.

### Pronunciation Lists

The Harris-Jacobson Word List, the Spache Revised Word List, and the Dolch Basic Sight Vocabulary of 220 Words were used to create a pronunciation list of 160 words. The words were grouped into 40 sets of 4 words per set. Of these 40 sets, 11 were developed from the Harris-Jacobson list, 14 were from the Dolch list, and 14 were from the Spache list.

The four-word sets were made up of semantically-grouped words, with the semantic relationship implied by the grouping. For example, *car, truck, wagon, cart* made up a set of lexical words; *by, into, around, upon* illustrate a structure-word set.

The same 160 words were used to generate seven lists of 40 sets of 4 semantically-unrelated words (e.g., *meat, girl, supper, in*; and *where, do, ask, three*). No attempt was made to maintain either structural or lexical word categories. The seven lists of semantically unrelated word sets were developed to reduce list affect.

### Pronunciation Task

Each subject read two word lists; one with semantically-related word sets and one list with semantically-unrelated sets. A one-week interval separated the two readings. Lists were randomly assigned such that 12 of the subjects read the categorized list at the first session. The remaining pupils read the semantically-unrelated (random) word list. Those who read the categorized list at the first session then read the random list at the second session; those reading a random list first, read the categorized list the second session.

For each reading, the subjects were handed the appropriate list and were simply requested to read the words. A stopwatch was used to time the task. Subjects were also tape recorded as they read.

### Design and Analysis

Analysis of variance was used to treat data drawn by repeated measures, using three groups (vocabulary comprehension; comprehension vocabulary; vocabulary = comprehension) and two lists (categorized and random) via an ANOVA program (Veldman). The first analysis compared the time (in seconds) required for oral reading of each of the two lists. The other three analyses involved a comparison of (1) total pronunciation errors, (2) lexical pronunciation errors, and (3) structural pronunciation errors.

### Results

The facets of priming associated with retrieval or storage of lexical and structural words were investigated by analyzing the total time required for the subjects to read each list and by analyzing the number and type of word-reading errors. Four analyses were employed to investigate priming effects. No significant differences were found within the ANOVA model for time in seconds (T-Sec) as the dependent measure. Nor was there a significant difference between groups (vocabulary, comprehension, neutral) on the T-Sec variable

for pronouncing the categorized vs. randomized lists.

Of the remaining analyses (total pronunciation errors, lexical pronunciation errors, and structural pronunciation errors) computed between groups (vocabulary, comprehension, neutral) there were no significant differences. That is, there were no differences among these three groups in reading the words on the categorized list as compared to their performance on the randomized list.

However, two of the lists comparisons were significant: total errors [ $F(1, 22) = 17.56$ ;  $p = .003$ ] and lexical errors [ $F(1, 22) = 29.72$ ;  $p = .00001$ ]. In each of these comparisons, the subjects read the categorized list with fewer word-calling errors than were made when they read the same words on the randomized list. The third comparison used the number of errors on structural words across the two lists. There were no significant differences. The subjects read the categorized structure words about as well ( $X = 2.39$ ) as they did the randomized structure words [ $X = 2.17$ ;  $F(1, 22) = .219$ ].

### Summary, Conclusions, Recommendations

Blocking of words into semantically related categories did not reduce time in seconds required for pronunciation. That is, there was no significant time difference for pronouncing the 160 categorized words as compared to the pronunciation of these words in a randomized arrangement. In the studies previously cited (Collins & Quillian, 1969; Bower, et al., 1969; Meyer (Schvaneveldt, 1971, 1976; Forbach, et al., 1974; Neely, 1977; Cohene, et al., 1978; Shuart, 1979) categorization via semantic loading seemed to improve task performance with time as the variable.

However, pronunciation of words on the categorized list did result in significantly fewer word-calling errors ( $p = .003$ ) than was found on the random list. The investigation of list effects showed that errors in pronouncing categorized lexical words were significantly fewer ( $p = .00001$ ) than randomized words.

Blocking of lexical words into semantically-related sets does appear to facilitate word calling or pronunciation since random assignment of these same words into nonprimed sets appears to result in a greater number of errors in word calling. To this extent the spreading activation model is supported in this study.

Pronunciation of structure words seems not to be facilitated by arranging these words into semantically-related sets. The number of word-calling errors on these words across the lists did not differ significantly. It may be that these words are not stored in memory the same way as are lexical words. Had the structure words been presented as separate lists (categorized and randomized) other analyses could have been made by using time to pronounce and frequency and type of word-calling errors as the criterion measures. Such a procedure may have provided the information upon which to build a stronger inference regarding the storage and retrieval of structure words.

Not having reached significance for the structure-word error rate may be due to the subjects' poor verbal fluency and the abstractness of structure words. According to the PPVT scores, the subjects tended to be at the low end of the average range, indicating some ineptness in verbal fluency. The relationship among the words in each structure-word set was only implied. The combination of the abstractness of these words and the poor verbal skills of the subjects may have caused the subjects not to note the implied relationship of the words. Therefore, there would be no priming effects for either time to pronounce or for reducing word-calling errors.



A significant time differential across the lists may not have been obtained because of the readers' familiarity with the words. LaBerge and Samuels (1976) held that, "If . . . the stimulus processing does not require attention (i.e., it is automatic), then the response latency will not include stimulus processing time" (p. 550). However, the fewer pronunciation errors on the lexical categorized words do suggest attention to meaning in some way. Because of confounding variables, it is difficult to provide more than very tentative guesses.

One conclusion does appear to be valid. Teaching strategies for poor readers should include attention to establishing meaning referents in terms of supersets and properties. In addition to developing understandings of word structure as a processing/recognition skill, attention should also be given to priming attributes. To assist learner concept development, teachers would do well to present property labels (words) in a hierarchical manner, thus showing relationship among the words and thereby enhancing the learners' concept formation. Doing so would support the oft-stated, "We more nearly bring meaning to what we read rather than to derive meaning from what we read." Pearson and Johnson (1978) make use of such an approach/teaching technique and bringing meaning to the reading task as a foundation point to build upon in developing skills in reading.

Additional research is needed. If lexical words were separated from the structural words, each type of words could be analyzed in primed and in random arrangements. Perhaps using words not so familiar to the subjects would yield a primed effect through a difference in time required to read the categorized vs. randomized word lists. Finally, increasing the number of words per set and, for the structure words, stating the semantic relationship for each set might result in significant pronunciation differentials for time and/or errors. If this were to happen it would be an indication that lexical and structural words are similarly stored and retrieved. Recording the word-calling mistakes for analyses and for comparison with the correct words should also offer insight into long-term memory storage. Additional investigation of the spreading activation theory using elementary school subjects appears to be warranted.

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### A STUDY IN THE EFFECTS OF PARADIGMATIC LANGUAGE TRAINING AND ITS TRANSFER TO THE READING AND WRITING PERFORMANCE OF ADULT ILLITERATES

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The purpose of this study was to investigate the effects of special training in paradigmatic language structures on the paradigmatic language responses, the reading performance, and the writing performance of adult illiterates. The study attempted to answer three questions: 1. What are the effects of special training in paradigmatic language structures on the paradigmatic language responses of adult illiterates? 2. What are the transfer effects of special training in paradigmatic language structures on the reading performance and writing performance of adult illiterates? 3. How will time affect the gains shown after treatment?

A review of the literature on word association indicated that most of the research had been conducted by psychologists and linguists (Esper, 1973; Nelson, 1977). The studies reflect an interest in the analysis of association responses as they reflect language and thought. It was found that the responses of children were different from those of adults (Brown & Berko, 1960; Entwisle, 1966; Palermo & Jenkins, 1966). Children responded with phrases which included the stimulus word in a syntactic structure. Adults responded with words that could serve as replacements and were of the same form class as the stimulus word. The terms syntagmatic and paradigmatic evolved as classifications for these types of responses and were validated by Beauvois (1973).

Researchers have investigated responses to determine whether or not a relationship exists between the patterns of an individual's word association responding and reading. A strong relationship was found to exist between paradigmatic language responding and reading (Bickley, Bickley, & Cowart, 1971; Brosier, 1974). Researchers attempted to determine what the effects of special training in paradigmatic language structures were on the reading achievement of learning-disabled and normal children (Cartelli, 1976; Dinnan, Sullivan, & Cartelli, 1979). As yet studies have been conducted with atypical adults, such as adult illiterates in a prison setting.

Although attempts have been made to establish literacy programs in prisons, none have shown any consistent and permanent impact on the system. There are many reasons for the failures of programs for the illiterate inmate, including insufficient materials, inadequate instruction, and lack of instructional time.

The sample in this study consisted of 10 volunteer male inmates of a minimum-security prison in northeast Georgia. Only inmates who read at less than the 5.0 grade level were included in this study.

All subjects in this study were pretested using the *Oral Paradigmatic/Syntagmatic Language Inventory* (Dinnan, 1971) and the *Woodcock Reading Mastery Tests*, Forms A and B (Woodcock, 1973) subtests: letter identification, word identification, word comprehension, and passage comprehension. The subjects were asked to write on a specific topic; their writings were analyzed using a type-token ratio (Carroll, 1964; Fox, 1972).

Training in paradigmatic language structures was implemented immediately after the pretest data were collected. Training took place at the correctional institution for 1½ hours every Tuesday and Thursday evening from January 29, 1980, to May 8, 1980. Approximately 45 hours were spent on training. The instructional program was based on *Basic Learning Technology* (Ulmer, Dinnan, & Moore, 1978), which was developed for the Georgia State Department of Education.

The first posttesting was conducted immediately following the completion of the special training program. The Oral P/S and the Woodcock were administered to all subjects at this time. Subjects were again asked to write on a specific topic. Residual testing, following the same procedures, was conducted five weeks after instruction was completed. Alternate forms of the Woodcock and different writing topics were used for each test period.

A repeated-measures analysis of variance was the statistical design used to analyze the effects of time on the gains made at the end of the special training and five weeks after special training was completed. A series of Dunn *t* tests were calculated to further analyze the data. The .05 level of significance was designated for rejecting the null hypotheses.

It was found that there were significant differences between the repeated-measures scores of paradigmatic language responses, reading performance, and writing performance. As there was no control group (the inmates composing the group were paralled before the data could be collected), the effects of special treatment, which were significant on all three variables, may have been produced by other factors. Therefore, only the effects of time will be included here.

There was a significant difference in the subjects' paradigmatic responses on the pretest, posttest, and residual test ( $F(2,18) = 5.47; p < .05$ ). Time of testing does affect paradigmatic responses.

A series of Dunn *t* tests was calculated to compare the mean scores for each time of testing. It was found ( $p < .05$ ) that there was a significant mean score difference between the pretest ( $\bar{x}_1 = 19.1$ ) and posttest ( $\bar{x}_2 = 26.5$ ). It was further found ( $p < .05$ ) that there was a significant difference between the pretest ( $\bar{x}_1 = 19.1$ ) and residual test ( $\bar{x}_3 = 27.2$ ). There was no significant difference found between the posttest ( $\bar{x}_2 = 26.5$ ) and residual test ( $\bar{x}_3 = 27.2$ ). The results indicate that gains made in paradigmatic language responding do not dissipate over time.

There was a significant difference in the subjects' reading performance on the pretest, posttest, and residual test ( $F(2,18) = 27.11; p < .001$ ). Time does affect writing performance.

A series of Dunn *t* tests was calculated to compare the mean scores for each time of testing. It was found ( $p < .01$ ) that there was a significant mean score difference between the pretest ( $\bar{x}_1 = 449.2$ ) and the residual test ( $\bar{x}_3 = 481.8$ ). It was further found ( $p < .05$ ) that there was a significant mean score difference between the posttest ( $\bar{x}_2 = 462.8$ ) and the residual test ( $\bar{x}_3 = 481.8$ ). There was no significant difference found between the pretest ( $\bar{x}_1 = 449.2$ ) and the posttest ( $\bar{x}_2 = 462.8$ ). The results indicate that the gains made in reading performance continued to increase after instruction was completed. Gains did not dissipate over time.

There was a significant difference in the subjects' performance on the pre-test, posttest, and residual test ( $F(2,18) = 5.47; p < .05$ ). Time of testing does affect performance.

A series of Dunn *t* tests was calculated to compare the mean scores for each time of testing. It was found ( $p < .01$ ) that there was a significant mean score difference between the pretest ( $\bar{x}_1 = .87$ ) and posttest ( $\bar{x}_2 = .73$ ). It was further found ( $p < .01$ ) that there was a significant difference between the pretest ( $\bar{x}_1 = .87$ ) and residual test ( $\bar{x}_3 = .65$ ). There was no significant difference between the posttest ( $\bar{x}_2 = .73$ ) and residual test ( $\bar{x}_3 = .65$ ). The results indicate that gains in writing performance do not dissipate over time after special training was completed.

## Conclusions

The results of this study indicate that paradigmatic structures can be taught to atypical adults in an institutional setting. Inspection of the mean scores indicated that once the paradigmatic language framework was established, it did not dissipate over time. This reinforces Cartelli's (1976) findings on the effects of paradigmatic language training.

Another major observation of this study was that reading performance mean scores showed an increase at the end of the special training program. Additional mean score growth was noted on the residual testing. It is likely that the transfer effects of the special training are responsible for the growth.

Gains shown at the end of instruction did not dissipate over time for any of the variables. It appears that once the paradigmatic framework has been established, it becomes an active part of the cognitive processing of the subjects. When the oral readiness aspect of the training has been affected, training progresses to applying the same principles of contrasts and classifications to reading and writing. Subjects learn to transfer the use of paradigmatic language structures to other areas. Once the subject has learned to think paradigmatically, he becomes part of the general speech community and is able to deal with instruction in the expected language. Learning takes place and continues to develop even after formal instruction is completed.

Writing performance of the atypical adults showed significant improvement within the confines of the report. This study did not attempt to remediate the structural and grammatical skills of the subjects. The emphasis was placed on the content of the writing, ideas, and whether or not the ideas were successfully communicated. Part of the training included discussion centering on four basic themes: 1. Man in relation to man; 2. Man in relation to himself; 3. Man in relation to nature; and 4. Man in relation to the supernatural. Subjects were asked to discuss and write about their relationship to nature, society, and so forth. The output, in terms of the numbers of words that they wrote, increased considerably.

Positive conclusions can be made about the effectiveness of this program for an adult prison population. In terms of the improvement in literacy, the program appeared successful



since there were significant gains made on all the dependent variables. In addition, informal conclusions can be made about the effectiveness of this program on the behaviors of the inmates. Observations of behaviors were made and certain changes were noted during the course of the instruction. The subjects became more verbal from the first class session to the last. All of them participated in the class activities and exhibited a positive attitude about the class and each other.

The subjects appeared to gain self-confidence about their ability to learn and to use language. They wrote more letters to friends and family. They discussed among each other during the day ideas which had been presented in class the night before. They wanted to learn more and felt that they could do so.

By the end of the program, some of the subjects were asking about literacy programs that they could participate in when they were released from prison. Some were getting information about jobs that they would like in the future. They were trying to find ways to make places for themselves in the outside world. These actions all indicate the effectiveness of the program.

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## REACTION: ALTERNATIVE READING INSTRUCTION FOR PRISON ILLITERATES

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The research reported in "A study in the effects of paradigmatic language training and its transfer to the reading and writing performance of adult illiterates": 1) employs a specific and unique set of materials and teaching strategies; 2) focuses on a segment of adult illiterates selected from inmates in a minimum-security prison; and 3) assesses the effect of instruction on the subjects in terms of time periods allotted to teaching, testing, and retesting.

According to the review of the literature in the report, the failure of many prison educational programs may be attributed to inadequacies in materials, instruction, and time.

The study uses 1) the paradigmatic/syntagmatic language test; 2) the paradigmatic language structures in teaching strategies and materials; and 3) the time lapse in testing and retesting periods. These are apparent efforts to investigate alternatives to the problems previously cited as causative factors in unsuccessful attempts to teach adult illiterate prisoners and problems in the valid and reliable measurement of those attempts.

#### Reaction

Testing and teaching procedures which contribute to efficient and recognizable gains in reading and writing skill and which motivate the student to practice reading and writing activities are beneficial at any level of instruction. However, such outcomes are vital to the success of instruction with adult illiterates. Consequently, the conclusions drawn in the report are of practical as well as theoretical importance.

The loss of the control group from this design forced the researcher to make some cautious interpretations of the statistical results of scores of paradigmatic language responses and reading and writing performance and to focus more attention than originally designed on the "effects of time." However, the use of informal and unobtrusive observations made by the researcher are used to support and in some instances extend statistical results.

Subjective interpretation of the results of an investigation is often considered a weakness in research. In this study, it indicates the humane attitude of an individual researcher and teacher working in what is sometimes the inhumane circumstance of the prison environment.

However, evidence of such an attitude, in conjunction with the findings of the study, does emphasize some of the unanswered questions, limitations of the paper, and the need for replication of the study.

It is also true that the constraints of a brief paper prohibit the extended yet needed explanation of such complex components as the testing and teaching strategies used in paradigmatic language structures. The bibliography for a paper such as this one then becomes an important reference and, indeed, a source of expansion. It would have been helpful to have a reference to the more extensive publication upon which this paper was based.

This study includes some limitations which are the results of the uniqueness of the subjects' circumstances and would be difficult to overcome. The untimely (for the researcher) parole of the control group proved that the subjects were not nearly so "captive an audience" as might have been anticipated. The small number of all male subjects representing

a restricted geographic region severely limits the generalizability of the results. The dual role of researcher and instructor presents possible problems of interpretative bias but also provides opportunities for unobtrusive observation which would, otherwise, be lost to the researcher. It is such subjective observations in combination with more quantifiable results which suggest future investigations of paradigmatic language structures in prison educational programs involving: 1) larger numbers of subjects; 2) more varied subjects representing broader geographic regions, sex categories, ethnic origins; 3) more stable control group and/or alternative instruction groups; 4) varied and quantifiable assessments of subjects' writing samples; 5) pre- and post-instruction measures of attitude (concerning reading, writing, additional instruction, self-concept); 6) case study techniques; 7) longitudinal research designs; 8) evaluation of influence of student exchanges, with discussions related to instruction but taking place outside instructional periods.

The results of the study contribute new possibilities for instructional materials and teaching strategies in penal institutions. The need for replication as well as expanded research is implicit. Hopefully, the base of investigation which this study establishes will be extended.

#### AN INVESTIGATION OF VARIABLES THAT PREDICT GAIN SCORES IN TITLE I READING PROGRAMS IN PENNSYLVANIA

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Historically, reading instruction has played an important and accepted role in the curriculum of the elementary school. Knowledge of how to read is essential for one to function and to contribute to society. Student growth in reading skills is the single most important goal of the reading program (Farr, 1969).

Eliminating illiteracy is of national concern. The Economic Opportunity Act became effective in 1964 as part of President Johnson's "War on Poverty." In 1965 the United States Congress passed the Elementary and Secondary Act (Fromboluti, 1979). This act initiated Federal aid to education on a broad scale. Title I of this act provided funds to improve elementary and secondary school programs for educationally deprived children in low-income areas. Early evaluative studies of the effectiveness of Title I were inconclusive partly due to infancy and diffuseness of the program (not focused on basic skills and not serving the most needy students) and also due to the lack of adequate evaluative data (Executive Summary, ETS Study, 1976). However, research has continued and in most areas the programs have improved.

Recently, the International Reading Association published a book, *Teaching Reading in Compensatory Classes* (Calfee & Drum, 1979), which provides a relatively complete description of various aspects of compensatory reading instruction. These descriptive data were gathered from a survey of over 500 schools and 1500 teachers. The original study was conducted in 1971 by the Educational Testing Service (ETS) under a contract from the United States Office of Education. This nationwide survey included principals and teachers in all types of schools. The results of the ETS data were analyzed and interpreted by a committee of International Reading Association members at the request of the IRA Board of Directors.

In addition to national surveys regarding the overall effectiveness of the Title I programs, investigations have been conducted on various aspects of Title I Reading programs at the state level. (Brooks, 1975; Kaufman, 1976, 1977; Kean, 1979).

The question frequently asked is what variables are predictors of reading achievement. However, the question is seldom answered with conclusive results. Thousands of teachers with considerable years of teaching experience have testified that no one, simple, magical solution is available. A review of the literature suggested that the following variables contributed to success in reading. (1) socio-economic status of the school and community; (2) student attitude; (3) teacher competence and experience; (4) school organization; (5) per pupil expenditure; (6) amount of instruction time; and (7) instructional approaches and materials used by teachers.

The question is continually raised as to the effectiveness of federal efforts in compensatory education. The answer to this is still undetermined. Rand (1978) reported that numerous surveys have attempted to resolve the question, with generally mixed and uncertain results. It seems obvious that educators and researchers need to collaborate to further study what factors promote the most successful development in terms of growth and achievement in reading.

Because some school districts in Pennsylvania appear to be more successful than others in terms of reading achievement, the purpose of the study was to identify which of the following variables were associated with significant growth in reading achievement as determined by Normal Curve Equivalent (NCE) gain scores. The variables considered were as follows: (1) percentage of boys in the program; (2) length of program as measured in terms of weeks; (3) classification of the residence area; (4) per pupil expenditure; (5) number of aides utilized per teacher; (6) years of teaching experience as a reading specialist; (7) pupil-reading specialist ratio; and (8) number of specialists for the fourth grade.

The population for this study consisted of 50 school districts in Pennsylvania who utilized the 1965 Gates MacGinitie Reading Test and had student populations over 150 in the public schools. Using a table of random numbers, every eighth district involved in a Title I Program with a student population over 150 was chosen until the study had 50 districts.

The data collected were from the 1978-79 annual reports submitted to the Title I Office in Harrisburg, Pennsylvania, computed statistical reports from the Bureau of Research and Evaluation in Harrisburg, Pennsylvania, and from an information sheet completed by the Title I project directors. The data represented all fourth-grade students participating in public school Title I programs in the selected 50 districts.

Stepwise Multiple Regression Analysis was the statistical technique employed to determine which of the independent variables were the best predictors of the criterion variable.

The results of the study indicated the following:

- (1) School districts with fewer boys showed significant gains in NCE scores at the .05 level.
- (2) School districts involved in the Title I program for a fewer number of weeks showed greater NCE gain scores.
- (3) Metropolitan, other than center city students displayed significant gains over nonmetropolitan community students in achieving higher NCE gain scores.
- (4) Although not significant at the .05 level, per pupil expenditure appeared to contribute to the amount of variance in NCE gain scores.
- (5) School districts employing more aides showed lower NCE gain scores.
- (6) The years of teaching experience as a Reading Specialist did not contribute significantly to higher gain scores.



(7) The larger the number of students per Reading Specialist, the higher the NCE gain score.

(8) The number of specialists utilized appeared to make no difference in the gain scores.

### Discussion

The literature suggests there tends to be more boys than girls in remedial reading classes. Since one cannot eliminate boys from the reading program, the data were computed without the percentage of boys to determine whether there were other variables that would contribute significantly to higher gain scores. An analysis of this statistical data revealed that type of residence area (metropolitan-other than center city, or suburban) contributed significantly to greater gain scores.

The researchers's analysis as to why greater gain scores with fewer weeks in the program appeared to occur was because some districts began the program in September, one month prior to the pretesting. Those districts which started the program after the pretesting tended to show greater gain scores.

There is no conclusive evidence to support why school districts employing more aides showed lower NCE gain scores, but it is theorized that aides were often given "teaching duties" and were only occasionally supervised by the Reading Specialist.

In the future, additional research needs to be conducted in order to foster improved instruction and greater achievement growth in reading. Some areas recommended for further study are: (1) investigate instructional practices in compensatory classes; (2) include attitude as one of the variables; (3) investigate time on task by the students; (4) conduct a replica of this study including more school districts in the state; (5) research the achievement test utilized for evaluation and the curriculum of the schools; and (6) investigate the relationship between student gains in reading and general academic performance.

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### SENTENCE COMPLEXITY AS A FACTOR IN THE RELATIVE DIFFICULTY OF THREE PASSAGES OF VARYING SYNTACTIC COMPLEXITY

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The assumption behind most readability formulas, that longer and more complex sentences make a passage more difficult to comprehend, has been challenged by studies of the oral language patterns of children and their relationship to reading comprehension as well as studies indicating that the language maturity of the reader may be an important factor in what he finds difficult to read and understand. Results of studies by Fisher (1934); Strickland (1962); Loban, (1963); Hunt (1965) (1966); and Menyuk (1969) have indicated that the speech of most children includes a wide variety of language patterns, including complex sentences, by the time they enter school. There are also indications that children comprehend most readily materials most similar to their oral language patterns (Strickland, 1962; Lutz, 1974; Ruddell, 1965). In a study in which the relative ease or complexity of sentences conveying the same idea but varying in structure was investigated, Pearson (1974) found that the third-grade and fourth-grade children involved seemed "not only to be able to handle complexity, but actually to prefer it." He reported finding no support for the practice of "simplifying" material by rewriting it with shorter simpler sentences.

Longitudinal studies by Loban (1963; 1968; '970) have indicated a tendency for children who were most competent in oral language patterns by the age of 5 to be superior in reading and writing as they grew older. He also found that children increased in their language maturity with age. Hunt (1965) found that older students tended to include in a phrase or clause what younger children wrote as separate sentences. He conducted a number of studies involving analysis of writing of children of different ages to find indicators of maturity in writing and concluded that T-unit length tended to increase consistently with age and could be considered a kind of "growth bud" of writing maturity. On the basis of the students' writing which he collected, he developed syntactic complexity scores for various age groups, with mean T-unit length and mean clause length as the syntactic factors indicated (Hunt, 1970).

The relationship of writing maturity to reading comprehension was investigated by Smith (1971) who wrote passages at 4th, 8th, 12th, and Average Adult levels of complexity, using Hunt's standards, and administered them to children of various grade levels. He found that while fourth graders performed best on comprehension checks on the fourth-grade level materials, eleventh graders did the poorest on material written at this level. He also found the reading performance of the older students generally superior on all passages to that of the younger. He concluded that what a student normally produces in his writing influences, and is influenced by, what he is reading. The possibility that improvement in writing maturity may also positively affect comprehension of more difficult materials has been investigated in a number of studies, including those of Hughes

(1975) and Combs (1977) which indicated improvement in comprehension performance for seventh-grade readers following instruction and extensive practice in sentence combining.

Despite these findings relevant to sentence complexity and reading, simplification of materials by reducing sentence length as well as vocabulary load continues to be suggested as a means of making material easier for a poor reader to understand.

Klare (1974), Pearson (1974) and Neuwirth (1980) indicate that the factors which are predictive (sentence and word length, for example) may not necessarily be the factors causing the difficulty, but may be reflecting a wider variety of underlying factors. Therefore, the simplification procedure may be built on a false assumption.

The present study was designed to investigate the effects of sentence complexity on the relative readability of three passages by college students designated as proficient, average, and weak readers. Purposes of the investigation were: (1) to determine whether more complex sentence structure aided or impeded comprehension performance; (2) to determine whether student ratings of the relative difficulty of the passages corresponded with performance indicators; (3) to determine whether comprehension performance and perception of difficulty varied among students identified as proficient, average, or weak readers; and (4) to ascertain the extent to which students of different reading levels perceived the variance in sentence complexity as the element affecting passage difficulty and the extent to which they isolated other factors.

### Subjects

The subjects were 97 college students at a state university, 20 freshmen from special sections of a college developmental English section, and 77 upperclass and graduate students in education enrolled in classes in content area reading.

The Comprehension Section of the Iowa Silent Reading Test, Level III, Form E, 1972, was used as an indicator of reading comprehension proficiency. On the basis of norms designed for students entering four-year colleges and universities, students whose scores fell in stanines 7, 8, and 9 were designated as proficient readers; those with scores in stanines 4, 5, and 6 as average readers; and students with scores in stanines 1, 2, and 3 as weak readers.

### Materials

Three 310-word passages were constructed at 6th, 10th, and Average Adult levels of syntactic complexity using standards for mean T-unit and mean clause length developed by Hunt (1970). All three passages dealt with the subject of protocol and were constructed from three different segments from the same parent source, "Profiles: Good Manners and Common Sense" by Kuhn (1964).

In order to limit the passage variability to the sentence complexity element as much as possible, attempts were made to control the vocabulary variable in the three passages. Number of syllables in each passage were kept as constant as feasible: 6th grade, 491; 10th grade, 504; and 12th, 494. Also, number of difficult words, defined as meanings of words not familiar to 70% or more of children below 6th grade level, as indicated by Edgar Dale's *The Living Vocabulary: A National Vocabulary Inventory*, were kept constant (33 per passage).

The readability levels of these passages, as indicated by the Fry readability formula, were 8th grade for passage one (6th grade sentence complexity level); 9th grade for passage two (10th grade sentence complexity level); and 10th grade for passage three (Average Adult sentence complexity level).

The 10 comprehension questions for each passage were constructed so that 5 were at the literal level and 5 at interpretive. All items were multiple-choice.

A brief rating sheet and questionnaire was devised in order to obtain students' ratings of relative passage difficulty and information concerning the factors they felt contributed.

### Procedures

Students read the 3 passages at one sitting, answering the 10 comprehension questions after each passage. Subjects were allowed to reread portions of the passage if they wished as they answered the questions. The comprehension check was untimed, but all students completed it within one 50-minute period.

Following the administration of the instrument, the rating sheet and brief questionnaire was distributed to students. Subjects for this study were limited to the 78 students who were enrolled in secondary/content area reading classes.

Subjects were asked to rate the three passages as to their relative ease or difficulty for obtaining facts and for gaining overall ideas of the paragraph. They were also asked to explain their ratings. A six-point scale was used to quantify ratings consistently. If a particular passage was considered easiest of the three for understanding both facts and ideas, the point value of 2 was assigned; if, on the other hand, the passage was considered most difficult in both respects, the assigned point value was 6.

Analysis of variance was used to determine whether performance on and rating of difficulty of the three passages differed significantly for the group as a whole, or for subgroups of students categorized as proficient, average, or weak readers.

Student responses as to reasons for rating passage difficulty as they did were grouped according to the syntactic complexity level of the passage designated as most difficult: 6, 10, or Average Adult. Responses for the proficient and average readers were categorized as to whether they related to the syntactic complexity element involved or to other student perceived differences such as variation in style of writing, quality of paragraph organization, or vocabulary.

## RESULTS

### Comprehension Performance

1. Comprehension performance for the total group of 97 students was highest on the passage constructed at Average Adult syntactic complexity level and lowest on the 10th grade passage. Performance differences were significant at the .01 level.
2. For students designated as proficient, average, or weak readers, performance on the Average Adult level passage was highest for all three groups. No significant between-group differences were found.
3. Comparison of the overall comprehension performance of proficient, average, and weak readers indicated significantly higher comprehension performance for proficient than for weak readers on all three passages.



### Rating of Passage Difficulty

1. When overall ratings of passage difficulty were compared for the 77 advanced college students involved in this phase of the study, the Average Adult passage was indicated as the easiest, and the 10th grade passage as most difficult. Differences between the Average Adult and other two levels were significant at the .01 level.
2. When ratings on the three passages were compared for the proficient and average readers which constituted this sample, both groups indicated the Average Adult level passage as easiest. However, the proficient readers tended to consider the 6th grade passage as most difficult while the average readers tended to consider the 10th grade passage most difficult. These between-group differences were not significant, however.

### Student Explanations

Student explanations for their choice of a specific passage as "most difficult" is summarized in Table 1. The number of students indicated at the top of the columns represent the numbers of proficient and average readers designating each passage as "most difficult." Explanations given for each passage by those students who found the passage "most difficult" will be reported separately with explanations relevant to the syntactic complexity element reported first and other reasons, second.

#### Passage 1 (Sixth Grade Syntactic Complexity Level)

1. Explanations were predominantly related to the syntactic complexity element for both proficient and average readers; all but one proficient reader offered this type of explanation. Responses considered relevant to this category included direct statements about the relatively short and simple sentences in this passage as well as more indirect statements referring to this passage as "choppy", "disconnected", "fragmented", or "full of unrelated details".
2. Explanations relevant to factors other than the syntactic complexity element related to organization (indications that passage was poorly organized), style (perception of the first passage as narrative and others as more expository) and vocabulary (vocabulary considered more difficult than in other passages). As Table 1 indicates, these explanations were more frequently offered by average than by proficient readers.

#### Passage Two: 10th Grade Syntactic Complexity Level

1. Explanations for the difficulty of this passage were less frequently related to sentence complexity than to other factors for both average and proficient readers. Where sentence complexity were cited, it usually was related to this passage having shorter and simpler sentences than passage three, and therefore was found to be "choppy" or "disconnected."
2. The most frequent explanation cited by both proficient and average readers was that this passage was poorly organized and hard to follow in comparison to the others. Those whose comments were relevant to style saw this passage as more factual or technical than the first.

#### Passage Three: Average Adult Syntactic Complexity Level

1. Two of the three proficient readers rating this passage as most difficult indicated the increased complexity of the sentences as a factor in the difficulty. This type of explanation was also offered by two of the nine readers involved.
2. Two thirds of the average readers rating this passage as

most difficult felt the passage was more technical than the others, and therefore more difficult to understand. Organization was not cited as a factor by either group of readers, and difficulty of vocabulary by only one in each subgroup.

### DISCUSSION

Since both performance and student perception of reading ease indicated the passage with the most complex sentence structure as easiest, the assumption stemming from readability research that "short and simple equals easy to understand" was not supported. Results would tend rather to support the "chunk model" theoretical position which "claims that comprehension consists of synthesizing atomistic propositions into larger conceptual or semantic units rather than analyzing complex units into atomistic propositions" (Pearson, 1974).

The fact that the 10th grade, rather than the 6th grade syntactic complexity level passage, was considered most difficult somewhat confounds the issue. Student explanations support the possibility that this may have been due to "unplanned" features of the 10th grade passage relating primarily to organization that seemed to cause problems, especially for less proficient readers.

Although significant differences did not exist between average and proficient readers on the three passages, certain tendencies seem worthy of further investigation. The proficient readers, for example, seemed more sensitive to the syntactic complexity element, particularly with reference to the first and third passages. Also, while both groups of readers performed more poorly on the 10th grade passage, the proficient readers considered the 6th grade passage more difficult. Three readers indicated that they felt the questions for the 10th grade passage were more ambiguous than the questions for the other passages. This also raises another issue worthy of further investigation.

The results of the study should be interpreted cautiously due to a number of limitations including: (1) the large difference in the numbers of proficient, weak, and average readers involved in the study which would raise questions about the statistical validity; (2) availability of data concerning perception of difficulty and explanations for advanced education students only, all of whom were classified as average and proficient readers by the Iowa Silent Reading test comprehension section; and (3) the use of three different original passages which, even though from same "parent" source, may have introduced a number of extraneous variables.

Further investigation of the issue in studies with more representative samples of proficient, average, and weak college readers and with more control over "outside variables" would seem warranted. The inclusion of student ratings and explanations was considered valuable in isolating possible factors needing further investigation, and is recommended for subsequent studies.

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Table 1

## Summary of Explanations for Passage Designated as Most Difficult

| Response Category   | 6th Grade S.C.*    |                 | 10th Grade S.C.*   |                 | A.A. S.C.*         |                 |
|---------------------|--------------------|-----------------|--------------------|-----------------|--------------------|-----------------|
|                     | Proficient Readers | Average Readers | Proficient Readers | Average Readers | Proficient Readers | Average Readers |
|                     | (13)               | (13)            | (12)               | (17)            | (3)                | (9)             |
| Sentence Complexity | 12<br>(92%)        | 8<br>(61%)      | 2<br>(17%)         | 7<br>(41%)      | 2<br>(66%)         | 2<br>(22%)      |
| Organization        | 1<br>(8%)          | 3<br>(23%)      | 5<br>(42%)         | 10<br>(59%)     | —                  | —               |
| Style               | —                  | 4<br>(31%)      | 4<br>(33%)         | 3<br>(18%)      | 1<br>(33%)         | 6<br>(67%)      |
| Vocabulary          | 2<br>(15%)         | 3<br>(23%)      | 1<br>(8%)          | 4<br>(23%)      | 1<br>(33%)         | 1<br>(11%)      |

\*S.C.—Syntactic Complexity

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## REACTION: SENTENCE COMPLEXITY

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The results of studies by researchers such as Goodman (1967), Strickland (1962), and Ruddell (1976) indicate that children can most easily read sentences which are similar to their own oral language patterns. Children have difficulty reading sentence patterns which differ from their own patterns. An investigation by Smith (1971) indicated that the level at which syntactic structures appear in the writing of students is the best level for reading for that student. Level of syntactic complexity of reading materials does affect reading comprehension.

Fairbanks and Ledesma investigated the effects of sentence complexity on the relative readability of three passages by college students designated as proficient, average, and weak readers. Twenty (20) students were selected from college developmental English, while 77 (78?) were selected from upperclass and graduate students in education. The groups were designated according to stanine scores on the Iowa Silent. There is, however, no report of how many students were weak as opposed to average or proficient readers. Are we correct to assume that all twenty (20) freshmen in developmental English were weak readers, and conversely, that all graduate students were proficient readers? Were these students selected because they represented the best possible sample or because they were "intact" groups and readily available? A statement concerning the skill make-up of the group and selection process would clarify concerns relative to population sample.

Three (3) passages for student consumption were devised from the same source. The researchers went to some degree of trouble to control passage variability by keeping "as constant as feasible" the number of syllables per passage and the number of difficult words. The Fry formula measuring readability was used and indicated levels of 8th grade for passage one, 9th grade for passage two, and 10th grade for passage three. The Fry formula measures the average number of syllables and the average length of sentences. One therefore, must question whether the difficulty of the passages was held constant, and whether sentence complexity (syntax) was the only variable between passages.

The passages were constructed at the 6th, 10th, and Average Adult level of syntactic complexity using standards for mean T-unit and mean clause length. The T-unit has been questioned as a valid means for assessing difficulty of sentence complexity. Schmidt (1978) found that contrary to the research of O'Donnell, Griffin, and Norris (1976) mean T-unit did not measure the complexity of passages when one of two had been manipulated to increase complexity. A simple version of the passage had more words per T-unit (15.64) than did the complex version (13.09). This is supported by the work of Fry and Weber (1978) who found that sentence length was not as important a factor as the amount of embedding found in sentences. It was found that center-embedding increased the complexity of sentences. Research supports the use of formulas which measure the amount of embedding resulting from manipulation of syntax (Schmidt, 1978; Botel and Granowsky, 1972; Jenkins, 1977).

Fairbanks and Ledesma performed an analysis of variance to determine whether performance on and rating of difficulty for the three (3) passages differed significantly for the three (3) groups. The weak readers, however, were not given a questionnaire and were therefore different from the other

groups in this way. Differences between ratings of passage difficulty for average and proficient readers were not significant. If weak readers had been included the data might have yielded different information. Or were they weak enough to have experienced a significantly different perception of passage difficulty?

Average and proficient readers tended to rate as "most difficult" those passages with "choppy", "disconnected", "fragmented" sentences. This supports the contention that students use more complex sentences as they mature, and that, students read best what is written at their own level of linguistic competence. (It is interesting to note that all readers, weak included, read all passages competently). Since "disconnected" sentences caused difficulty for the students, it is interesting to this writer that Ledesma rated sentences which appear to be disconnected as one T-unit while more connected sentences were rated as two T-units. The ratings by average length of T-unit may be in error when one considers ease of reading or "readability". Perhaps grammatical complexity is indeed too complex to be measured by length of T-unit. Unusual grammatical structures (ones not appearing frequently in the reader's own expressive language) are more difficult to comprehend than are longer more common-appearing T-units.

It has been found that the development of syntactic complexity occurs up to and perhaps into adulthood (Smith, 1971). It should prove interesting to research the variability of comprehension of passages written above the Average Adult complexity level, especially if college students are to be used as subjects. Passages could be developed with high complexity levels based upon number of and type of embeddings and permutations which result in syntax which is not easily predictable. Surely our college texts (or professional journals) could provide challenging material for passage construction!

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## TEACHERS' ANALYSES OF STRATEGIES EMPLOYED IN MISCOMPREHENSION

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Durkin (1978-79) in a search of the literature was unable to find an adequate definition of comprehension instruction for her classroom observational studies. She does differentiate the asking of questions in the classrooms she observed from instruction for the following reason: "Rarely . . . was anything done with wrong answers except to say that they were wrong" (p. 490). If classroom teachers are able to use "wrong" answers as a diagnostic and/or instructional tool, analysis of students' disabling comprehension strategies is a critical step.

That students use identifiable reading reasoning strategies has been suggested by research with third-grade students verbalizing answers to a silent reading test (Bowling, Noel & Laffey, 1977) and average and above average sixth-grade students as they verbalized while selecting among multiple choice comprehension items (Kavale & Shreiner, 1979). The necessity of relating reading performance to the specific reading task is highlighted by Blaricom & White (1976); they found substantial differences in fifth-grade students' ability to generate acceptable responses to main idea questions and their ability to select a correct response.

Strange (1980) proposes the term *miscomprehension*, from the term *miscue* for *inexact oral responses*, to analyze what students do when responding to stories read. His explanations for miscomprehension are based on a schema theory of comprehension which "seeks to explain how new information acquired while reading is meshed with old information already in our heads" (p. 393).

This study was designed to provide information on classroom teachers' analyses of reading reasoning strategies employed by their students that they characterized as experiencing comprehension difficulties which were unrelated to word recognition difficulties. Researchers disagree on the importance of accurate and rapid word recognition on comprehension (Cromer, 1970; Fleisher, Jenkins, & Pany, 1979; Guthrie, 1973; Kendall & Hood, 1979; Perfetti & Hogaboam, 1975). In the researcher's experience, classroom teachers frequently express perplexity when designing instruction for students evidencing comprehension difficulties but who appear to have adequate word recognition. Also, eliminating word recognition difficulty as an explanation for miscomprehension in the study was thought to foster a greater focus on reasoning strategies.

Students were tested in their own classrooms by their regular reading teacher to provide a non-clinical setting. Working with these students on a continuing basis, reading teachers could readily identify subjects with comprehension difficulties: such students were deemed appropriate candidates for the study.

### The Study

Teachers asked to gather data for the study were graduate students participating in the Right-to-Read consortium classes at Alabama A & M University. Through a handout, teachers were instructed to gather data according to a six step strategy including identification, diagnosis, analysis, transcription, and activities.

Because of the exploratory nature of the research and an interest in the miscomprehension strategies that might be generated by classroom teachers as they analyzed the responses of their own students, the miscomprehension ex-

planations suggested by Strange (1980) were not presented to teachers. However, miscomprehension terminology was used in the directions. Teachers in the study did have a basic familiarity with miscue analysis (Goodman & Burke, 1971; 1971).

The informal reading inventory (IRI) administered was the *Auburn Informal Reading Survey* (AIRS) (Noland, 1974).

Some form of analysis of students' comprehension was provided by 23 of the 26 teachers on 45 students at the following grade levels: Four students in 1st-grade, 7 students in 2nd-grade, 15 students in 3rd-grade, 4 student in 4th-grade, 9 students in 5th-grade, 1 student in each of the 6th, 8th, and 9th grades, and 3 students in the 7th-grade.

Findings in these data suggested the need for further data collection with another IRI. Through the analysis of a large number of responses to questions on the AIRS, certain test questions appeared to be non-discriminating with these students.

Teachers in this second group were graduate students enrolled in the researcher's reading testing course. Two students not actively teaching tested children referred by classroom teachers for comprehension difficulty. As a part of the data collection process for course requirements, this group also administered the *Wisconsin Tests of Reading Skill Development: Comprehension* (Otto, 1977) to these same students. Data were gathered during November, 1980.

The informal reading inventory used by these students was the *Sucher-Allred Reading Placement Inventory* (Sucher & Allred, 1973). At least one question on this instrument was non-discriminating.

Some analysis of comprehension strategies was made by thirteen of the graduate students on 26 children at the following grade levels: 7 students at 2nd-grade, 6 students at 3rd-grade, 7 students at 4th-grade, 4 students at 5th-grade, and 2 students at the 6th-grade.

### Results and Discussion

A great diversity in description was used by teachers to explain miscomprehension, making clearly identifiable categories difficult. Essentially the same words were used by 13 teachers in the first group to identify lack of knowledge of the key vocabulary in the story as a miscomprehension response. Only one teacher in the second group identified this as a strategy. Seven teachers indicated that the child's own experience caused him to miscomprehend while one teacher in the second group clearly described this as a strategy. Teachers in both groups tended to describe the miscomprehension strategies of both children they tested in the same terms, even when differences were noted, such as "misses context clues" for Child 1 and "uses some context clues but missed some" for Child 2. Word recognition difficulties and description of the miscomprehension in terms of the kind of question missed were identifiable. Although described in varying terms, it appeared that many teachers analyzed the child's comprehension strategies relative to individual reader characteristics.

It was decided to test the *usefulness* of these apparent categories and the miscomprehension strategies suggested by Strange as they related to these teachers' miscomprehension explanations.

Independent analyses of teachers' explanatory comments related to these categories were made by the researcher, a university teacher of undergraduate and graduate reading methods courses, and a graduate student clinician teaching undergraduate reading courses. Meetings among the raters sought to resolve any differences of opinion.



After thorough familiarization with the categories, the raters showed marked agreement on the classification of the teacher explanations. Some categories suggested by Strange seemed by the raters to require modification, not only to mesh with teacher categories, but to better describe the responses being made by children. These modifications will be delineated along with discussion of the tabulation of teacher explanations for each category. A strategy identified by an individual teacher was counted only once although, as noted, categories were frequently repeated by individual teachers.

The following five categories were generated from teacher explanations.

A) Word Recognition: The child's comprehension is affected by word recognition difficulties.

That 22 teachers delineated word recognition problems for students supposedly selected because of good word recognition but poor comprehension highlights their difficulty in isolating a *pure* comprehension disability. Teachers also related problems in identifying such students with their testing; their choices were frequently not confirmed by testing, necessitating other choices.

B) Question Type: The strategy employed by the reader is described in terms of the *kind* of question miscomprehended.

The 26 teachers who focused on the kind of question missed used comments such as "missed two getting fact" and "problems with literal comprehension and sequencing." The delineation of question types in both of the instruments used, as well as in the *Wisconsin Test* used by the second group, probably contributed to analyses identifying question types miscomprehended.

C) Non-Specific: The explanation given provides no insight into the reasoning strategies used by the reader.

This category was selected for 26 teacher responses which lacked definitiveness, such as *poor recall* and *does not remember specific parts from story read*.

D) Inhibiting reader characteristics: Personality traits, emotional or cognitive skills such as inferential thinking in non-reading situations explains the miscomprehension. *Somewhat unsure of herself* and *often comes out with strange conclusions* are examples of these 17 categories of analysis.

E) Inhibiting task strategies: The reader's approach to the task interferes with comprehension. Extremely rapid reading, lack of concentration on the reading task, or a view of reading as only calling words are constraints affecting comprehension.

Nineteen teachers cited explanations that appeared to fit here, including *reading too fast and omitting known words* and *didn't even think about reading rules*.

The following seven categories were suggested by Strange (1980) as explanations for miscomprehension by children when a story is discussed with them.

- 1) No existing schema: This category meshed with many of the *lack of key vocabulary* categories. These fourteen categories included *didn't understand meaning of 'land forms'* and *no experience with spaceship*.
- 2) Naive schema: Other explanations for vocabulary deficiencies given by seven teachers seemed to the raters to fit better here, such as *understood 'suction' to a small degree but could not use meaning to a new situation or reference point*.
- 3) No new information: While no teacher categories fit clearly here, the raters' views were that many of children's miscomprehended responses would fit in

this category if expanded to include *details that did not impact on the main point of the story for the child*. This would include the child's response, for example, of *Sunday* instead of *Saturday* as the day the child in the story was going to the circus.

- 4) Poor story: The raters felt that this category should also include *poor question* with an emphasis on the child responding to the story or question. This would thus include stories which did not interest the reader and questions the reader did not understand. Based on this expansion, eight teachers appeared to identify this category with analyses such as *didn't understand way questions were stated, especially those that were lengthy*. Those questions that almost all children miscomprehended could also be included in this category.
- 5) Many schemata appropriate: This category was selected as appropriate for the seven teachers who made statements such as "maybe this is what excites him" and "drawing from own background."
- 6) Schema intrusion: The raters also thought this category should be modified to be useful, based on the actual responses children gave. When the child answered because of a schema intrusion, a *plausible line of reasoning* was usually in operation. For example, the child's response that hens in the story were "clucking" for food, rather than because the fox was there as told in the story, was found to live on a chicken farm, making her *wrong* response plausible. Only two teachers appeared to use this category with "just used own logic" as an example."
- 7) Textual intrusion: Only three teachers appeared to be applying this category with an added element such as *thinking of previous story*.

### Summary and Conclusions

Difficulty with key vocabulary appeared the most identifiable miscomprehension strategy, from teacher analyses and as raters categorized explanatory comments relative to Strange's categories of miscomprehension. Such a focus is consonant with the schema theory of comprehension: "Schema theory suggests that vocabulary instruction should be given greater emphasis than it currently is" (Strange, p. 394).

Other explanations for miscomprehension suggested by teachers appeared unrelated to the schema theory, with a focus on word recognition, the nature of the question students missed, and a third general category for explanations that lacked definitiveness in explanation. Such categories suggest the need for analyses of miscomprehension that can be clearly linked with appropriate instruction.

A focus on learner characteristics and the learner's perception of reading, if valid, suggests a need for individualization in comprehension instruction.

Other categories for miscomprehension relevant to the schema theory proved less useful although all evidenced some usefulness, according to the raters. Their experience in analyzing reader responses and teacher explanations for miscomprehension suggests this procedure as a valuable activity by which teachers may become more alert to and cognizant of the reasoning strategies their students employ when responding to questions.

The usefulness of all categories combined with the large number of non-definitive explanations made by teachers suggests that teachers be supplied with miscomprehension strategies before they analyze students' responses to

questions. Such a procedure may engender greater specificity as teachers analyze readers' reasoning processes.

An unexpected finding suggested by the study was the necessity of extensive testing when developing informal reading inventory questions that validly assess comprehension. Teachers' ready acceptance of non-discriminating questions suggests the need for a more critical approach by teachers to the questions asked in informal reading inventories and those asked of children in the daily reading lesson. A greater range of acceptance answers in IRIs and basal reader manuals appears needed.

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#### A STUDY OF THE EFFECTS OF LISTENING/READING TRANSFER ON FOUR MEASURES OF READING COMPREHENSION

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During the past two decades, the schools of this country have reacted sharply to the demands of society to "teach more and teach it earlier." In order to accommodate this demand,

teachers in the elementary grades have tended to over emphasize the word identification component of the reading process. This focus has produced a predictable outcome. Nationwide, standardized test results have shown an increase in word identification scores, but a decrease in comprehension scores (Karslen, 1973). Faced with the realization that children can often "decode the words with limited understanding of their meaning," teachers are seeking more effective instructional strategies to improve comprehension.

One such strategy offered by Cunningham (1975) suggests a listening/reading transfer method in which students learn that the types of activities they are able to do after listening to a passage are the same types of activities they are requested to do after reading a passage. To facilitate the transfer of comprehension skills, two parallel lessons are designed by the teacher. In the first, the students listen and respond in specific ways, e.g. determining the main idea, organization of ideas, inferring cause and effect, etc. Immediately following, a similar selection is read and responded to in the same manner. Each lesson includes six steps which are to be performed in order, although the format of the exercises can and should be varied. A sample lesson on stating the main idea of a story (taken from Cunningham) will illustrate this procedure:

- (1) Set the purpose for listening. "There are three sentences on the board. All are about things that happen in the story I am about to read to you. As you listen, try to decide which sentence tells the main idea of this story—the most important idea. Try to choose the sentence you would tell someone if they asked you what the story was all about."
- (2) Read the selection to the children.
- (3) Have the children volunteer choices for main idea; have them explain why that choice seems to tell what the story is mainly about and why the others do not.
- (4) Give the children mimeographed sheets with three sentences and a story and tell them to read to determine which of the sentences tells the main idea.
- (5) Children read and choose the main idea.
- (6) Children share their choices and the explanation for the choices as a whole class or in small groups.

According to Cunningham, three underlying principles are essential for the success of this approach. First, students are asked to do the same thing while reading as they had previously done while listening, and that they realize the similarity of the two processes. Second, the teacher must establish definite purposes for listening and reading. Finally, it is necessary to get the children to verbalize how they arrived at a certain answer. Through such probing and explanation, children who cannot comprehend will be able to observe the inner workings of those who can.

#### Purpose

The present study sought to compare the effectiveness of parallel lessons in listening and silent reading to a traditional basal approach to comprehension skills instruction. One hundred and seventy-four fifth graders from 16 randomly selected classrooms in a large midwestern suburban school district participated in the project. Eight classrooms (N=91) served as an experimental group while the remaining eight (N=83) served as controls. The lowest level reading section of each class (those who can usually decode but cannot understand what they have read) constituted the treatment/non-treatment sample. All students had achieved a minimum of one year below grade level on the reading subtest of the *Iowa Test of Basic Skills*. No significant difference between the experimental and the control groups was found when a two-tailed *t*-test was performed on mean I.Q. scores.

#### Procedure

Prior to the initiation of the experiment, a one day in-



service workshop was held for teachers, supervisors, and reading specialist monitors. At that time procedures were explained, techniques defined and practiced, and lessons planned. After the orientation period, all subjects were pre-tested with Form A of the *New Developmental Reading Tests* (Bond-Balow-Hoyt, 1968). This test which evaluates literal and creative comprehension has an alternate form reliability of .89 and an internal consistency reliability of .94. The *t*-tests of group means indicated that no significant differences existed between groups on the four subtests under examination. A 14-week teach/non-teach period was then begun. In lieu of the normal basal instruction, the experimental group received one listening/reading transfer lesson per daily reading session utilizing materials from a supplementary basal series. Control groups received only the traditional basal instruction which adhered to the scope and sequence of the teacher's manual. The time devoted to reading instruction within the framework of a language arts block was equivalent for both groups. Although the experimental teachers followed the six steps of the listening/reading transfer method and emphasized the underlying principles, the activities in the lesson plans were individually conceived and independently constructed. During the 70 teaching sessions equal time was allotted to the comprehension abilities of recognizing the main idea, recalling stated details, recalling sequence of events, sensing relationships among ideas, recognizing cause/effect relationships, inferring main idea, predicting conclusions and outcomes, understanding the implications of stated ideas, understanding characterization, and sensing the tone of the selection. At the conclusion of the training period, all students were post-tested using Form B of the *N.D.R.T.* Reading supervisors spent four to six hours weekly observing classroom proceedings to ensure that guidelines were being followed.

### Materials

Subtests II, III, IV, and V of Forms A and B of the *New Developmental Reading Tests for the Intermediate Grades* (4, 5, 6) were used for pre- and posttest measures. The pupil behavior domains sampled by the test items in each of the four parts are: II. Reading for Information—recall specific terms, note important details of information stated, recognize fundamental concepts, use the facts to answer specific questions; III. Reading for Relationships—sense relationships among ideas, note ideas which do or do not belong in a group, note the order of occurrence; IV. Reading for Interpretation—recognize the importance of each concept. Weigh the relative importance of ideas, derive inferences, conclusions, and predictions, understand the implications of stated ideas; V. Reading for Appreciation—sense the feeling tone, grasp the sensory impression, note the motivations of characters.

Selections for the listening component of the lesson plan were taken from the students' supplementary basal series, The Houghton Mifflin readers. The choice of material read to the children was based on considerations of length and purpose. Passages had to be short since the audience would be listening intently, and they had to lend themselves to the purposes set for the lesson, i.e., sequencing, cause/effect, etc. Reading selections were segments of basal stories being covered in class. The New MacMillan Reading Program served this purpose. Again, portions chosen accentuated the comprehension skills being taught.

### Results

The data were analyzed using two-tailed *t*-tests to determine the significance of the differences ( $p = .05$ ) between group

mean gains on four subtests of the comprehension instrument. No significant differences existed between groups on Subtest II, Reading for Information ( $t = 1.22$ ,  $p > .05$ ). However, significant differences were found on Subtest III, Reading for Relationships ( $t = 2.16$ ,  $p < .05$ ), Subtest IV, Reading for Interpretation ( $t = 12.17$ ,  $p < .001$ ), and Subtest V, Reading for Appreciation ( $t = 8.91$ ,  $p < .001$ ).

### Conclusions

There is at present little research that shows that activities such as the listening/reading transfer lesson will lead directly to gains in reading comprehension. However, like other response specificity techniques (SQ3R, Guided Reading Procedure, USSR), the listening/reading transfer lesson appears to be based on accepted theory and rooted in logic. It seems reasonable that reading with a purpose is more efficient and productive than reading without one. Students who read for specified reasons will be thinking as they are reading and not merely receiving information they are supposed to consume. The traditional basal reader format directs the teacher to introduce concepts and the vocabulary of a selection, and then, after children have read the story, to ask questions. The intent of this post questioning is to direct the students' attention to what they *should* have been looking for as they read. By setting purposes prior to reading, children are taught how to apply and extend their mental abilities as strategies for developing comprehension skills. Similarly, the listening component of the lesson functions as an illustrative, concrete sample of the skill that is to be utilized during reading. Since elementary school children can usually understand more when a passage is read to them than when they read it themselves, the combined employment of the auditory and visual modalities should enhance learning.

The results of this study indicate that including a listening/reading transfer supplement to basal reading activities can positively affect the so-called upper levels of comprehension. Since both groups in the study fared equally well on a test of reading for literal information, this may imply adequate treatment in this area by basal reading programs and lesser emphasis on relationships, interpretation, and appreciation of material read. These findings tend to affirm Cazden's (1972) and Smith and Barrett's (1977) recommendation that teachers must be aware of and consciously direct classroom activities toward developing higher level comprehension skills and less upon the memorization of endless factual information.

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## REACTION: EFFECTS OF LISTENING/READING TRANSFER

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The authors of this study have indicated that their purpose was to compare the effectiveness of parallel lessons in listening and silent reading to a more traditional basal approach to comprehension skills instruction. The results indicated that the group receiving the parallel lessons in listening and silent reading did significantly better on the higher order comprehension skills than the groups receiving lessons by a traditional basal approach. There was not a significant difference between the groups on the lower order comprehension skills at the literal level.

These results are not surprising since teachers using the basal teacher's manual exclusively often do not get to the higher order skills like interpretation, relationships, and appreciation. They become bogged down with introducing vocabulary, working with the structural and phonetic analysis skills, working with comprehension at the literal level, directing oral reading, and giving the children enough background to do the workbook pages that go with the lessons. The results in reverse seem to indicate that, if we are only interested in children learning decoding skills and in reading for information (or at the literal level), then the basal approach is enough. Skills such as asking for single item recall and finding the main idea are related to a literal interpretation of the story. If, on the other hand, we are concerned that children develop a higher order comprehension and thinking, such as singular and multiple inference, interpretation and concept analysis, relationships and differences, and appreciation and critical skills, we might need something else instead of or in addition to the basal approach.

One implication of this study is that active teacher involvement in the reading process might be a critical variable to developing better higher order comprehension skills. By getting the classroom teacher away from a reading program based solely on the basal and into an approach like the listening/reading transfer method, we are forcing them to get more involved in the reading process *with* the child. They become a participant in the lesson instead of just a rote giver of instructions and questions.

The basal approach is popular with teachers as it allows time to get things done while the children read and do the workbook pages and gives the teacher security in having covered "the essentials". The basal also does not take much preparation time for the teachers. As a matter of fact, many teachers can plan their reading lessons months in advance by just noting the basal pages to be covered and the corresponding workbook pages in their plan books.

The authors of this study have alluded that a problem with the basals is that they do not provide opportunity to read for a purpose. However, this reviewer has noted that teachers are often directed in basal manuals to ask a question to stimulate interest prior to asking the children to read. Doesn't that include reading for a purpose? The crux of the problem of the basal approach is the rote way it is often presented and the routine type of procedures that become established by the teachers using basals.

This study is valuable and should be replicated with elementary school children at different grade levels. In future studies, it might be well advised to assign children randomly

within classrooms to the experimental and control groups rather than assign whole classrooms into one group or the other. This type of research design would add to the validity of the findings as teacher effectiveness would not be a concomitant variable. Additionally, validity might be further increased by randomly assigning alternate forms of the pre and post tests to students in both groups to allow for possible difficulty differences between the forms.

Children enjoy being read to and it is possible that this enjoyment factor could be a concomitant variable positively affecting the children's attention and thereby affecting their comprehension of the intricacies of the story. One interesting extension of these studies could be to investigate the effect of this enjoyment factor.

## ACQUISITION OF INCIDENTAL READING VOCABULARY

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Methods of teaching beginning reading have not changed significantly during the past 30 years despite strides in communication technology. However, one change that has been seen in reading materials is the advent of read-along books for prereaders and beginners. Read-along books or listen-and-read materials are printed stories which are accompanied by an audio recording of the story-text. The objective is for the child to listen to the spoken words as he/she views the printed text. Publishers imply or state that read-along materials help children learn to read.

Most reading experts support the concept of incidental sight word vocabulary for beginning readers, meaning, that some sight words are learned without intentional teaching or deliberate attempts at remembering (Brown, 1975; Hall, 1976). Thus, it would seem to follow that children could learn some sight vocabulary words merely from following along printed material while listening to a recorded version of the text.

The purpose of this study was to investigate the effect of using read-along materials on the acquisition of incidental sight reading vocabulary for prereaders and beginning readers. This research was designed to investigate the following questions: (a) do prereaders and beginning readers acquire sight vocabulary words from exposure to read-along materials; and (b) are some type of words learned more readily than others.

Whether or not research evidence supports the use of read-along materials for the acquisition of incidental sight word vocabulary has interesting implications for beginning reading instruction and utilization of teacher time. Some kindergarten and primary grade teachers are using listening centers with read-along or listen and follow materials in their classrooms. However, an extensive review of the literature of beginning reading, visual perception, sight word acquisition, and reading readiness fails to disclose published research relevant to norming data for the acquisition of incidental sight word vocabulary based on read-along or listen and follow materials for beginning readers. Carbo (1978) reports reading gains using a recorded book technique in a formal reading program with children having severe learning disabilities. Chomsky (1976) also reports reading gains for average third graders when commercially produced recorded books are utilized. A review of the research of sight word acquisition indicates some factors which may influence the number of trials



necessary to learn words in isolation (McNinch, 1976; Spring et al., 1979). Other studies have investigated the child's conceptualization of the spoken word as it relates to the task of beginning reading (Chomsky, 1972; Johns, 1976). In related research E. B. Coleman has investigated the effect of word readability on the acquisition of beginning sight vocabulary. Coleman developed a model for designing easy to read materials. According to Coleman, highly motivational reading materials when presented in either cartoon or film-strip format yield incidental sight vocabulary (Coleman, 1975). The Coleman research did not involve the use of auditory materials for acquisition of incidental sight vocabulary. The Coleman materials did focus on short one- or two-word cartoon-type stories. The currently available read-along materials are generally not as simplistic as those suggested by Coleman's model.

### PROCEDURE

The subjects of this study were 36 children from two kindergarten classes of a school located in a southcentral state. Data were collected from one class of 20 children in the spring of 1980, and from a second class of 19 children in the fall of 1980. Due to illness and family moves, data on three of the original subjects was incomplete and deleted from final analysis. Children in this study were age 5 years before October 1st of the year they were enrolled in kindergarten. Thus, children tested in the spring of 1980 were near the end of their kindergarten year and closer to age 6, while children involved in the fall of 1980 sample were closer to age 5 years and were at the beginning of the kindergarten year. The study included 16 boys and 20 girls.

Each child was individually pretested using 88 flashcards of the words contained in the read-along stories to be used in the study. Most of the words are from the Dolch list of 220 easy words. After pretesting, the children participated in 5 daily sessions lasting approximately 10 minutes with read-along materials. At the first session, the teacher oriented the children to the listening center equipment and storybooks. During each session a taped version of a story was played twice as each child paged through an illustrated, printed version of the text. The week following the listening sessions, each child was posttested with the 88 flashcards. In both the pretest and posttest situations, no time limit was imposed for response.

### DISCUSSION

Using the t-test it was found that both the spring ( $t = 2.62$ ,  $p = .066$ ) and fall ( $t = 2.54$ ,  $p = .007$ ) classes of children made significant gains in incidental reading vocabulary as a result of the read-along sessions. The chance probability of the spring gain was .0008 and for the fall it was .0023. There was no significant difference between the means of the combined scores (pre and posttest) of the spring ( $X = 2.84$  and  $5.15$ ) and fall ( $X = 17.47$  and  $19.94$ ) samples. However, the older children nearing the end of kindergarten had significantly higher pretest and posttest scores than did the younger pupils nearer the beginning of the kindergarten experience.

When gain scores of the two groups are compared however, there is no significant difference (tested probability of  $t = .4333$ ) between the spring and fall classes. Therefore, it appears that regardless of length of time in school the children did make significant gains in incidental sight vocabulary although the initial means of the two groups differed significantly. Thus, both groups had the ability to profit from the read-along materials.

The second area of concern of this study was relevant to the ease with which words are acquired. Due to the nature of the student sample, mostly short, easy, primary level words were included in the read-along stories. Approximately 77% of the words were four letters or less in length. The 88 different words included in the stories were analyzed for: (a) the frequency of occurrence in the stories; (b) word length measured in number of letters; (c) word configuration; and (d) presence of special features. In each case student gain scores were correlated with word characteristics. Findings indicated that the frequency of occurrence of a word in the story was not significantly correlated to word gain. There was a significant correlation of .32 between length of word as measured in number of letters and incidental sight word gain. Gain tended to increase as the length of word decreased.

The word configuration characteristic was subdivided into four categories: (1) those words with no ascending or descending letters; (2) words having ascending letters; (3) words having descending letters; and (4) words having both ascending and descending letters. An analysis of variance of word configuration characteristics group gain score means demonstrated that words of the category 1 type, those having no ascending or descending letters, were learned significantly more easily than the other types, while category 2 type words, having ascenders, were least often learned.

Special feature words were defined as words containing a double letter. It was found that this feature of double letter was not significantly related to acquisition of incidental sight word gain.

### CONCLUSIONS

Based on the results of this study it can be concluded that read-along materials can significantly increase the incidental sight word vocabulary of kindergarten children. However, when gain scores of children were analyzed based on their pretest knowledge of sight words, it was found that children with greater knowledge of sight words prior to exposure to read-along materials, gained significantly more words from the listening and following sessions than did their peers. In fact, as the experiment was in progress it was noted that children who scored low on the pretest did not appear to follow the printed text as the tape was played. Low scoring pretest children appeared to be less attentive to the task of following words. Post treatment investigation demonstrated that many of the low scoring children did not recognize word boundaries in print. In short, children with low pretest scores (less than 3 words recognized) were less able to gain from read-along materials. Children who recognized from 0 to 2 words on the pretest had a mean gain of 1.17 words; children who recognized 3 to 7 words on the pretest gained 2.6 words; and the children who identified 10 words or more on the pretest had a mean gain of 4.44 words. Children having the highest average pretest scores also had the greatest posttest gain scores.

It would appear that based on the results of this study it is beneficial for teachers and parents to make read-along materials available to kindergarten age children. Kindergarten children can increase their sight vocabulary through the use of read-along type materials. However, prior to utilizing such materials the child has need for prerequisite skills of (a) recognition of boundaries of printed words, and (b) understanding of left to right word progression. It may also be found that the child who has not developed the two above concepts has not yet acquired an interest or curiosity about the printed word and is not ready for reading from a motivational viewpoint. A caution relevant to read-along materials should

be noted, however. Most commercially available stories do not stress controlled vocabulary nor high frequency word repetition. It may be that although word frequency was not highly correlated with word gain, the difficulty of vocabulary load could influence sight word gain. Further studies in the areas of long term retention and child attitude relevant to read-along materials are recommended. It would be interesting to know if voluntary usage of read-along materials affects word retention and sight word gain.

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### REACTION: ACQUISITION OF INCIDENTAL READING VOCABULARY

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In her investigation of the effects of having young students read along with tape recorded passages, Sullivan addressed one aspect of reading achievement: sight word vocabulary. This aspect deserves careful attention because meaning-oriented word identification instruction is based in part on helping students analyze their sight words. Furthermore, classroom teachers deserve applied research evidence to help direct their instruction. Basic research certainly has a place in developing a pedagogy of beginning reading instruction, but it seems that applied studies currently are being neglected in the professional literature. We require instructional research that investigates workable classroom activities such as reading along with taped versions of a passage.

According to the major conclusion of this study, the increase of incidental sight words that was demonstrated by both groups of children can be attributed to the read-along activity. However, this is not necessarily the case. The absence of a control group to compare treatment effects limits the trustworthiness of this conclusion. Although the read-along treatment may have produced the increase in sight word identification, it is quite possible that time in school or some other exposure to printed matter is the actual determining factor. The pretest-posttest design that was employed in this study provides very limited evidence about the actual effect of the experimental treatment.

In the conclusions section, it is noted that students who knew more sight words than their peers gained significantly more new words than did their peers. Testing the effect of prior sight word knowledge is an insightful move, and the conclusion makes sense. The mean gain scores do indicate an increase in favor of the students who initially identified more words. But again, this hypothesis could have been tested more rigorously. Gain scores are notoriously inconsistent measures because they reflect the unreliability of both the pretest and posttest instruments. In addition, the statistical analysis used to compare the gain scores is not reported. Was a single t-test computed, multiple t-tests, or ANOVA?

Finally, analyzing the features of words that related to their acquisition as sight words is another positive aspect of this study. In future studies, overall word frequency (Carroll, Davies and Richman, 1971) and imagery rating (van der Veur, 1975) might be considered as other features to compare or else control. There is evidence that these features exert a powerful influence on the "learnability" of words.

This study is a step in the right direction. It asks important, relevant questions. Conducting the treatment with different sets of children at different times is one check of the stability of results. The effects on sight word acquisition of read-along materials, word features, and students' prior sight word knowledge warrant investigation in applied settings. The reactions included here suggest some additional steps one might take in order to more thoroughly test those effects. additional steps one might take in order to more thoroughly test those effects.

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### COMPREHENSION INSTRUCTION OR ASSESSMENT—WHAT'S THE DIFFERENCE?

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Durkin (1978-1979) has initiated efforts not only to define comprehension instruction and assessment, but also to ascertain whether or not elementary schools provide comprehension instruction as she operationally defined instruction. This stance by Durkin has brought accolades from many and disconcerted grunts from a few. But notwithstanding the fact that an institution as sacred as comprehension questioning has been under review and analysis,



the curiosity and interest of reading researchers and practitioners have been piqued in an almost unprecedented way. Weintraub (1978-1979) stated the importance of Durkin's work succinctly. "This report, if heeded by the profession, is destined to have tremendous impact on comprehension instruction" (p. 76). Farr (1978-1979) stated that "Professor Durkin's study has some very interesting conclusions, but if a reader . . . fails to challenge Durkin's definitions, procedures, and conclusions—then the reader has missed the essence of research" (p. 74).

This writer also believes that the very essence of research is becoming involved in the thinking process that a particular study represents, and not necessarily a wholesale delivery of hard facts. This paper will attempt to provide an activity that will seek to have as its result, provocative thinking about important educational issues. This is done with the biased posture that reading research is more of a process than it is a product.

### Defining Comprehension Instruction and Assessment

Durkin (1978-1979) rather irreverently sought to define comprehension instruction and assessment in order to examine through classroom observations whether elementary schools provided such instruction. Durkin used components of reading comprehension listed by Golinkoff (1975-1976) as a basis for her definition. These components include: Decoding—Identifying individual words; Lexical Access—Having a "meaning for the printed word in semantic memory"; Text Organization—Extracting "meaning from units larger than the single word, such as phrases, sentences, and paragraphs." (p. 633)

Durkin then made perhaps the most significant step since Neil Armstrong eased himself onto the lunar surface when she suggested that comprehension "instruction" can be defined as activities in which the "Teacher does/says something to help children understand or work out the meaning of more than a single, isolated word" (Durkin, 1978-1979, p. 488). She suggested further that comprehension instruction has transfer value in that it helps students understand the meaning of connected text not used in that instruction. Durkin then startled the reading researchers and practitioners by suggesting that comprehension "assessment" involved activities in which the "teacher does/says something in order to learn whether what was read was comprehended" (p. 490).

The distinction that Durkin made between comprehension instruction and assessment is, of course, the *sine que non* for understanding the current controversy. The following examples give readers an idea of what "teaching" comprehension entails as defined by Durkin.

1. In the context of sentences, the teacher teaches the difference between "and" and "or".
2. Teacher teaches the meaning and importance of key words (each, match, underline, etc.) in written directions by using sample sentences and explanations.
3. With explanations by the teacher, and through the use of sample sentences, the teacher teaches the children that certain words signal sequence (first, before, at the same time, later, meanwhile, etc.).
4. Teacher discusses, explains, or tells the meaning of "main idea" and "supporting detail". Paragraphs are analyzed by the teacher and students. Some of these paragraphs contain a main idea and supporting details. Others contain only a series of details. Comparisons between the two kinds of paragraphs are made by the teacher and students.

### Observing Comprehension Instruction

Thirty classrooms were observed in 17 schools in at least 13 different school systems for 300 hours in the state of Illinois. Grades three through six were included

since these were the grades that Durkin thought should be stressing comprehension. Reading and Social Studies were observed. Social Studies was observed to determine if teachers taught reading and study skills in the content area.

A request was made to see the "best" teachers. While there is no guarantee that the best were seen, it is likely that the worst were not. Teachers did not permit any research at the beginning or end of school, or during the weeks that preceded Halloween, Thanksgiving, Christmas, and Valentine's Day. What was seen was the "nucleus" of the instructional programs.

Each classroom was visited on three successive days which were scheduled so that all five days of the week would be included with equal frequency by the time the research terminated. This was done to reduce the likelihood that teachers would only be seen on an atypical day. The research began in September and continued until mid-May.

Reading comprehension instruction was observed for 44 minutes in 300 hours. The time was spent on comprehension assessment, writing assignments, and non-instruction. No teacher saw the Social Studies period as a time to help with reading. Study Skills instruction was not observed. According to Durkin, teachers in the study were primarily interrogators and assignment givers.

The influence of workbooks and assignment sheets was overwhelming. These constituted almost the whole of "instructional" programs. In every classroom observed, certain children did the work promptly and in a business-like manner. Others did what ever they could to avoid work. It could not be discerned whether a lack of interest or lack of ability accounted for the resistance. What could be identified were the discipline problems and chastisement that ensued.

Providing small classes and teacher aides was not a solution for classrooms studied. The class size average was 23 children. Some had only 11. In the classrooms that had aides, the teachers had them correcting workbooks. The result was more checking, according to Durkin, not better teaching.

### Examining the Definitions of Durkin and Hodges

Hodges (1980) challenged Durkin's definition of comprehension instruction and hypothesized that the introduction of another definition would lead to a much higher estimate of the time teachers devote to comprehension instruction in the schools. Hodges venerated Broudy and Palmer (1965) for having used more "historical exemplars of teaching" (Hodges, 1980, p. 300). Broudy and Palmer (1965) had presented a set of phases that occur regardless of the particular style of teaching. These involved: preparation for instruction; motivation; presentation of the learning task; inducement of the trial response; correction of the trial response; fixation of the response; and test response and evaluation (1965, pp. 9-12).

Notice that the first three of these phases could possibly involve a teacher saying or doing something to aid understanding. The last five phases are usually associated with testing.

Hodges then marched majestically backwards and attempted to apply *Principles of Instructional Design* by Gagne and Briggs (1974) to reading comprehension instruction. Gagne and Briggs list the following instructional events which were used by Hodges in developing an alternative definition

of comprehension instruction: gaining attention; informing the learner of the objective; stimulating the recall of prerequisite learnings; presenting the stimulus material; providing 'learning guidance'; eliciting the performance; providing feedback about performance correctness; assessing the performance; and enhancing retention and transfer (p. 135).

Notice the lack of direct verbal instruction in these "instructional events." Hodges (1980) criticized Durkin's emphasis on direct verbal instruction. Hodges stated that she could only "assume that the teacher must be involved in direct verbal instruction of some kind for the behavior to be considered as comprehension instruction" (p. 300).

Hodges included interrogation after reading, "helping" with assignments by asking additional questions, and even checking of workbooks by the child and teacher in her definition of reading comprehension instruction.

Hodges then took Durkin's data which reported that comprehension instruction represented less than 1% of the observation time in reading, and re-analyzed the data using the alternative definition. The re-analysis of Durkin's data using Hodges' alternative definition of comprehension instruction revealed that 23% of the time was spent in comprehension instruction. However, both agreed that direct verbal instruction by the teacher received the least emphasis, and questioning by the teacher received greatest emphasis.

These data obviously require researchers and practitioners to examine the research literature concerning the efficacy of questioning as an aid to learning. What effect do teacher questions have on comprehension? Do questions help in teaching a student how to comprehend?

#### Reviewing the Research on Questioning

There are several types of questions reported in the research literature. These include adjunct questions, preposed questions, and postposed questions. Questions inserted into running text are called adjunct questions. Questions placed before a passage are called preposed questions.

Some studies (Fraser, 1970; Rothkopf, 1966) have shown that preposed factual questions direct students toward finding answers to specific questions. However, incidental learning and depth of comprehension are affected.

Other studies have suggested that postposed questions assisted students not only in learning and retaining answers to the questions, but in learning additional information in the passage as well (Rothkopf, 1966; Fraser, 1967, 1968, 1969; Cohn, 1969). Other researchers have suggested that students, if given time to review, are encouraged by postposed questions to review the assignment for answers to the questions (Heller, 1974; Watts & Anderson, 1971). Yost, Avila, and Vexler (1977) demonstrated that as the complexity of postposed questions to seventh graders increased, achievement increased. The amount of time spent working on the questions also increased with question complexity.

Rothkopf and Bisbisco (1967) suggested that adjunct questions placed at the end of a section in a passage assisted students' attention and helped them to read the materials following the questions. However, Singer and Donlan (1980) stated that caution had to be exercised with the use of adjunct questions since they tended to narrow students focus of attention.

Several studies in the research literature have suggested that student-generated questions have a facilitative effect on both immediate and delayed recall (Chodus, Gould, & Rusch, 1977; Rosenthal, Zimmerman, & Durning, 1970). Helfeldt and Lalik (1976) demonstrated that reciprocal student-teacher questioning was found to be superior over teacher questioning

alone. Singer and Donlan (1980) suggested that if students imitate their teacher's questioning and formulate their own questions, they have the benefits of both preposed and postposed questions.

This writer would like to suggest that these studies to date regarding questioning have been measuring the effect that testing, formal and informal, has on comprehension. The research data suggest that the testing of students by asking comprehension questions affect later attempts to comprehend. Asking questions does indeed tend to shape the student's behavior, whether done by the teacher or by the students themselves. The data suggest that when students are faced with an evaluative exercise, the subjects attempt to do whatever they must to score well and please the tester.

#### Applying Content Area Strategies to General Comprehension Instruction

Spache and Spache (1973) state that there have thus far been two opposed viewpoints on developing comprehension, and postulate that both have failed to solve the problem.

One group emphasizes long lists of comprehension skills and the need to develop these. . . . Apparently this group believes answering a lot of questions, time after time, will enable the student to show whatever type or degree of comprehension later reading tasks demand. Another group of experts believe that the answer to comprehension development is to start with students' experiences and interests and exploit them. Actually both groups borrow ideas and training materials from each other and neither really practices what it preaches (p. 558).

This writer agrees with that analysis, but would suggest that the former group of interrogators far outnumber the latter group. The studies by Durkin (1978-1979) and Hodges (1980) support that allegation.

The current practice of using questioning to develop comprehension seems to be supported well by the research data as being an effective way to shape student behavior. That is really not the issue. In this writer's mind, the genuine issue raised by the Durkin study is whether or not direct verbal instruction by the teacher prior to the student's response can become a veritable alternative considering the state of the art. Can we in the field of reading do or say something before we initiate the interrogation that will actually aid the students substantially in their attempts to comprehend? Can we do more with comprehension skill instruction than start with students' experiences and interests, and/or ask comprehension questions?

This writer would like to introduce the idea that researchers may need to start looking at strategies used for content area reading improvement in an attempt to discover their potential application to general reading comprehension development. These instructional practices, heretofore neglected in general comprehension development, offer interesting possibilities.

Herber (1978) suggests that comprehension questions are assumptive. Herber states:

If students already are able to identify the significant information, to perceive the relationships in that information so as to formulate related ideas, or to synthesize those ideas with prior knowledge and experience, they already would have the skills which the teacher intended to teach when he or she asked the question (p. 193).

Herber, the research on questioning notwithstanding, then made the interesting statement that "If the students cannot do all this because they lack the skill, then no amount of asking—at whatever rate of frequency—will teach them how to apply the unknown skill" (p. 193).

Herber was looking to the teacher as a possible resource for doing or saying something prior to interrogation that would substantially assist the students in their attempt to com-



prehend. Herber suggested the radical idea that guides for different comprehension levels might be made up of declarative statements rather than questions. For example, a student who does not respond independently to questions at the interpretive levels would be provided with a guide of declarative statements. These statements are created by teachers asking themselves interpretive questions similar to the following:

"What does the author mean by what he says? What conclusions can I draw from this information? What is the author implying, and what inferences can I draw?" As the teachers respond to the questions, they write down the answers as declarative statements (Herber, 1978, p. 195).

These statements are then given to students on reading guides and serve as direct verbal instruction from the teacher. What a refreshing thought to think of inserted declarative statements from the teacher or from basal authors in a basal series serving as direct verbal instruction for the students who need it.

Estes, Mills, and Barron (1969) revealed the efficacy of structured overviews in developing comprehension. A structured overview is nothing more than a brief summary, abstract, or diagram for the content of a story (Singer & Donlan, p. 61). Tierney, Readence, and Dishner (1980) suggested that a structured overview can be presented as a picture or schematic diagram. Barron (1969) stated that the words in a structured overview assume the form of advance organizers and provide students with cues to the structure subjects. Earle (1969) suggested that structured overviews present to the students an idea framework designed to show important relationships.

How awesome to think of a basal reading series with a schematic drawing presented before a story in an attempt to use advance organizers with the young readers. It is mind boggling to consider the profundity of change that might occur in students' comprehension if the brief summaries or abstracts of stories used in basal teacher manuals were also duplicated in the students' books. These abstracts have vastly improved the teachers' comprehension of these stories. I think it safe to hypothesize the abstracts would also aid students' comprehension. Of course, a major problem might center around the lack of motivation when abstracts "spill the beans" and teachers could no longer furtively say, "Read the next page and find out why Jimmy couldn't buy the wagon from Mr. Jones."

Glossing has gained renewed popularity recently, particularly in Social Studies and Science textbooks (Singer & Donlan, 1980). "Essentially the gloss is like a teacher accompanying a student through a text" (Singer and Donlan, 1980, p. 56). Glosses are notes written in the margins of texts to serve any content or process purpose. Singer and Donlan suggest the following steps for teachers to follow in writing marginal glosses.

1. Read through the text, identifying vocabulary or other material to emphasize or clarify.
2. Write marginal glosses on ditto masters with page numbers and line numbers indicated on the left hand side of the ditto master.
3. Give dittoed glosses to students who insert them in their texts and refer to them as they read.

Estes and Vaughan (1978) have stated that study guides: develop reading skills rather than assume reading skill; compensate for individual differences rather than ignore individual differences; tend to facilitate teaching and learning rather than testing; and focus on conceptualization instead of recall.

This writer would like to suggest that researchers seeking to explore ways of introducing direct verbal instruction prior to interrogation in general comprehension development need to

examine the merit of reading guides.

Herber (1978) spoke of the need for content teachers to illustrate concepts visually for students in order to augment comprehension development. Never has this writer found in the section of the basal reader entitled "Preparation for Reading" a suggestion that the teacher draw to illustrate what happened prior to reading. This certainly should not happen with every story. But if the teacher is to teach the main idea before students are asked to give the main idea, this technique may result in the recognition of more main ideas.

## INFERRING THE DIFFERENCE

What is the difference in comprehension instruction and comprehension assessment? This writer would like to gingerly assert that the teaching of most things includes four major phases in a suggested order. These phases in rank order include instruction, application, practice, and evaluation. In the initial phase of instruction, the instructor plays the most conspicuous role while the learner plays the least obtrusive role. In this first stage, the instructors give themselves by doing or saying something that significantly enhances the possibility of success for the learners during the later phases of application, practice, and evaluation. The process then begins to reverse itself. By the time the evaluation phase (or comprehension assessment phase) is encountered, the learner plays the most conspicuous role, with the teacher in the background. Heretofore, comprehension development more exuberantly emphasized the utilization of the last three phases: application; practice; and evaluation. More often than not, application has been the initial phase rather than a corollary of instruction, and not altogether unjustifiably so. The state of the art just now involves questioning of our procedures. A definition of general comprehension instruction will only become an empirical reality after reading researchers have evaluated and chosen techniques that an "instructor" can efficiently and effectively use prior to application, practice and evaluation.

Notwithstanding our lamentations, most of our students are comprehending as evident from the National Assessment of Educational Progress (Gadway & Wilson, 1976). It cannot be disputed that most learners do very well with the typical instructional events that Hodges (1980) lists. Gaining attention, setting objectives, presenting a stimulus, eliciting the performance, and assessing the performance do indeed seem to result in achievement for those who can and do perform. Durkin has not disputed that. However, the National Assessment of Educational Progress and Durkin's data show that many of the students have not performed under these conditions.

The great debate over analytic and synthetic phonic instruction which has now spread over a century has taught us that eclecticism is necessary in choosing instructional strategies for decoding and early reading. A lack of eclecticism in comprehension development is what the research by Durkin makes so vividly clear. The teachers observed used virtually no direct verbal instruction. "This lack of eclecticism in reading comprehension instruction could prove as limiting as the lack of eclecticism in decoding strategies if we strive for full development of all the students' comprehension abilities" (Cloer, 1980, p. 567).

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## TEXTUAL CONSTRAINTS AFFECTING ADULTS' FREE RECALL

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Traditionally, the informal reading inventory (IRI) has been employed as a criterion-referenced test to determine students' reading comprehension ability (Farr & Roser, 1979). The most important component of silent reading achievement evaluated is the level of difficulty at which a reader can comprehend. This can be better determined by means of a well-constructed, well-administered IRI than by a standardized achievement test (Harris & Sipay, 1980). Silent reading comprehension is based, for the most part, on a student's ability to recall exact wording in order to answer specific literal questions. The most commonly used clinical informal reading inventory, *The Durrell Analysis of Reading Difficulties* (Durrell, 1955), goes so far as to ask the reader to verbalize all he/she can recall from the passage.

If literal recall for specific words from a passage is the deciding factor for determining silent reading comprehension on an IRI, could a scoring system based on memory for exact words from passages be developed so that a silent reading IRI might be administered to groups and then computer graded? One serious disadvantage to the administration of silent IRI is time required for individual testing. The development of such an instrument would benefit both classroom teachers and researchers investigating adult reading ability. Kirsch and Guthrie (1977-78) have noted the lack of a useful measure of functional literacy, which again, appears to be, on the most elementary level, ability to recall exact wording of text.

This study investigates the following:

- (1) How well do adults (chronological age: 20 to 88) remember exact wording from three expository paragraphs?
- (2) How is adult memory for wording related to independent variables including sex, age, level of education, content of passage, or type of purpose question (advanced organizer or prequestion)?
- (3) Is wording of IRI paragraphs deemed equivalent remembered equally well across paragraphs?

This study examines adults' long term memory for wording, a concept differing distinctly from memory for propositions. Klatzky (1980) cites previous research demonstrating that adults' memory for propositions is much better than their memory for surface structures, the specific wording of a message. McKoon and Keenan (reported in



Kintsch, 1974; McKoon, 1977) found subjects' memory for specific wording had vanished 20 minutes after original reading of a passage. Subjects apparently prioritized propositions which were then apparently more accessible for retrieval. However, results of a study by Anderson and Paulson (1977) indicate that although memory for verbatim information rapidly declines after presentation, subjects retain some information about wording of the initial sentence for intervals longer than those of STM storage.

Prior research in mathemagenics and discourse analysis suggests that long term memory for prose is affected by advanced organizers (purpose questions or pre-questions). Retrieval of information from long-term memory forms the basis for most measurements of silent reading comprehension of text. Gagne' and Memory (1978) noted that teacher-directed techniques for enhancing silent reading comprehension usually include some sort of purpose question presented to the reader prior to actual reading. Results of their study focusing on the effect of particular prequestions pinpointed three instructions that encourage the reader to relate old and new information for most effective recall of long term memory for prose:

- (1) try to form a vivid mental image of the material being read;
- (2) read to see how the passage is like a familiar example; and
- (3) provide the reader with background information.

Gagne' and Memory noted the importance of conducting research of this type using multiple passage, such as those offered in the *Ekwall Reading Inventory* (1979), in order to demonstrate generalizability.

## METHOD

### Subjects

The 72 adults participating in this study were divided into four age groups: 20-39 (N = 31), 40-59 (N = 13), 60-79 (N = 26), and 80-88 (N = 2). The 11 males and 61 females demonstrated three levels of education: high school degree (N = 9), college degree (N = 47), graduate degree (N = 16). Adults in the 20-39 year-old age division were undergraduate and graduate level students enrolled at the University of Southwestern Louisiana. Mature adults belonged to the JOY (Just Older Youth) Club at the First Baptist Church, Lafayette, Louisiana, and are, for the most part, retired professionals (classroom and college professors, teachers, ministers, or doctors).

### Learning Materials and Procedure

Three expository passages of 163 words (Forms A, C, and D) were selected at random from the *Ekwall Reading Inventory* (Ekwall, 1979). Readability level of the passages was determined to be eighth grade level, based on the Harris-Jacobson Readability Formula (Harris and Sipay, 1980). Passages were composed by Ekwall, and normed on 40 students. Reliability of passages, based on administering forms within a period of one week, resulted in product moment correlations of .79 between Forms B and D, and .82 between Forms A and C. For the purposes of this study the three passages were crossed with three different directions: (1) form a vivid mental image of the information in the following paragraph, (2) compare the information in the paragraph to a familiar, concrete example, or (3) this specific information relates to the following paragraph.

Ss were tested in small groups; they indicated age, sex, highest achieved level of education and occupation at the top

of a page, read the direction provided for the paragraph, and then read the paragraph at their own rate. When all Ss had finished reading, they received one of two distractor tasks: (1) a serial learning task comprised of 12 neutral words presented in four trials with words exposed for a two-second interval, or (2) a lecture on reading activities which enhance the lives of the aged. Each distractor task lasted 25 minutes. Long term memory for wording was triggered by the following vague probe stimulus: "Write down all you can remember about the paragraph you read earlier."

Protocols were scored on the basis of exact memory for wording. Ss received 1 point for each word which appeared on the original 163-word paragraph.

## ANALYSES

Free recall of wording by adults in this study was analyzed via 3 X 3 ANCOVA (passage by direction), with age, level of education and sex of subjects as covariates. No statistically significant main effects for direction or passage type were noted, ( $p < .77$ ,  $p < .49$ , respectively). The two-way interaction was also statistically nonsignificant ( $p < .81$ ). However, age of Ss was a statistically significant covariate ( $p < .05$ ) and subsequent one-way ANOVA and follow-up analyses of means of words recalled by the four age groups revealed that Ss aged 20-39 differed significantly from Ss aged 60-79 and Ss aged 80-88 in recall of exact words from paragraphs. The 20-39 year old adults remembered, on the average, 37.4 words (25%) of the 163-word paragraphs; Ss 60-79 recalled a mean of 29 words (18%), and Ss 80-88 recalled an average of 11.5 (7%) words.

Statistically significant differences were noted in one-way ANOVA of level of education across words ( $p < .05$ ). Subjects completing a graduate degree recalled an average of 39 words (24%) compared with subjects who completed a high school degree ( $X = 25.6$ , 16%). A negative Pearson correlation coefficient ( $r = -.58$ ,  $p < .01$ ) was noted between level of education and age; the older the subject, the less formal schooling received.

## DISCUSSION

Prior research investigating adults' memory for wording (Klatzky, 1980) was supported by the results of this study: 75% or more of adults' memory for surface structure (specific wording of a passage) had vanished 25 minutes after the reading of a passage. The exact words recalled were, for the most part, content words (nouns, verbs, adverbs, adjectives, e.g., *latex*, *altitude*, *transportation*, from the paragraph on rubber production) coupled with determiners (*a*, *an*, *the*). Anderson and Paulson's (1977) findings are also corroborated: some information about wording of the initial sentences is retained for intervals longer than those of short term memory storage. Subjects conceivably prioritized certain propositions and then rehearsed them, thus earning easier access for retrieval when needed for recall 25 minutes later.

No differences in memory for wording resulted from direction or passage type. Ekwall's three eighth-grade passages appear equivalent, if memory for exact wording is being measured. Teachers administering IRI's should note, however, that the longer a student is asked to wait before he answers literal questions from a passage, the more likely she/he is to reword and restructure the answers. Ability to recall exact wording of a paragraph, a skill necessary to respond to many specific literal questions, fades quickly, even in college subjects accustomed to professors requiring recall of exact phrasing over an extended period of time.

Matured adults (60-79) recalled, on the average, 8.2 words less than adults aged 20-39, but this represents only 1.7 words less than adults aged 40-59. A practice effect may have influenced scores since Ss in the 20-39 age category were all enrolled in college degree programs which require students to regularly practice reading and remembering wording from prose. Long term retention for wording of prose may prove responsive to structured training focusing on repetition. Gagne' (1978) notes that timing and nature of the repetition may be important factors in retention of prose; she suggests that it is time to refine research on the effects of repetition.

Memory for wording (literal recall of passages) could prove a viable field of study for researchers investigating adult reading performance. Evaluation of achievement is totally objective, while scoring may be computerized, and unlike many aspects of propositional analysis, is adaptable to group administration.

A cautionary note is interjected, however: only the very basic element of comprehension, literal recall, is being measured in this study. No attempt has been made to examine quality of recall or active reasoning about concepts remembered by subjects.

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#### COMPREHENSION OF CRITICAL NEWS ITEMS AS EXPRESSED BY COLLEGE STUDENTS AND ADULTS IN BUSINESS, INDUSTRY, AND RELIGION

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Researchers have concerned themselves with matters of comprehension and reading interests of individuals and groups of every age and level of education for more than a century. The results of various studies led Fisher (1962) and Smith (1964) to conclude that education seems to exert an important influence on readership. Russell (1960) goes a step

further to project that the amount of a person's reading is determined partly by his education and partly by the class of people to which he belongs. In other words, educational status and socioeconomic status are closely related to one another and to the amount and kind of reading done.

Certain magazine editors have long claimed audiences consisting of a class market. For example, *Fortune*, *Harpers*, and *Business World* have boasted of executives among their greatest clients; and the nature of articles in *Vogue*, *Esquire*, *Playboy*, and *Reader's Digest* requires at least a high school level of comprehension, if one is to read and enjoy them. Dulin (1969) researched the readability levels of adult magazines measured by four prevailing formulas and found that the reading difficulty of many of the popular ones that were earlier reported in a dissertation by Allias (1957) as having relatively low-difficulty levels had changed considerably. Among magazines on the Dulin list with college level reading difficulties were: *Reader's Digest*, *T.V. Guide*, *Esquire*, *Life*, *Ladies Home Journal*, and *Good Housekeeping*; while upper high school levels showed *McCalls*, *Redbook*, and *Post*; and at the lower high school grades was *Sports Illustrated*. Dulin attributed the increase in difficulty to two factors: (1) articles of near-scholarly interest are now appearing in them, and (2) general reading levels have risen over the years.

In re-emphasizing the values of reading to society, Dallman (1978) and her associates expressed the view that people who cannot read critically may be easily manipulated by the unprincipled who may solicit their time, attention, or votes. Further, they may not be able to contribute to their country through intelligent participation in decision making, and in action necessary for the security of their state and nation. In our technological age, people in business, industry, and the professions who find themselves unable to cope with the vast amount of reading materials which must be covered and understood within restricted time limits are decidedly handicapped.

Only a few weeks ago, Dieter (1980) pointed out that higher education is undergoing what may be the most significant internal change in half a century. "Professional fields such as engineering and business are becoming more important to this nation's economic growth and quality of life . . . Better engineering is becoming increasingly critical for the survival of America's standard of living . . . Declining natural resources, over-population in third world countries, poor health and malnutrition, and potential world conflicts are problems that are not going to go away" (p. 56). The impact of this big shift in students' majors in colleges and society, and other problems we face today bring clearly into focus two important implications: (1) business, industry, and other community organizations should provide courses, materials, motivation, opportunities, and incentives for their employees and other adults to keep abreast, via reading, of critical issues facing the country, and (2) colleges should provide more help to students enrolled in courses designed to prepare them for greater usefulness to the country.

While many studies have shown both college students and out-of-school adults to be interested in reading fiction and light poetry for relaxation, others have shown both groups to be caught up in the literature which reflects the times. For example, in Fagin's study (1929), students at Johns Hopkins were polled to ascertain their favorite periodicals and showed preferences in current events, problems, and conditions that determine the pattern of their existence. Two decades later, Weingarten (1949) studied the reading preferences of over 500 veterans in a Chicago junior college to find that many of the 224 magazines choices were related to vocational and



avocational interests with 189 in scientific and 70 in businesses. The overall preferences of this junior college group indicated a strong interest in the realities of life—issues of a post-war world and the problems of individual adjustment. Near the end of the next two decades, Adams (1969) studied the reading preferences of students in Lebanon, only to find that, having been recently uprooted from their homeland, they were reading political history and biographies of men of revolutionary stature in the hope of finding survival techniques.

From among the many concerns facing our country today, the researchers chose two for this study: *The U.S. and Iran—The Hostage Crisis* and *The U.S. Energy Problem*. These two concerns affect the lives of all Americans without regard to race or sex, and are explored in depth in current magazines. Are our college students and our out-of-school adults going beyond the mere listening to fleeting and often controversial news bits on these two national concerns to read and digest for themselves information that may be helpful in decision making and in intelligent and unbiased discussion of them? The best way to ascertain the answer to this question is to ask them directly.

The problem of this study, then, was to determine the extent of the reading comprehension of college students and adults on two critical issues of national concern; namely, *The U.S. and Iran: The Hostage Crisis*, and *The U.S. Energy Problem*.

#### Method and Procedures

In the absence of a standardized instrument to measure the comprehension of college students and adults on two national issues, members of the East Texas Educators Research Council devised an informal questionnaire for this purpose. Hypotheses proposed were as follows:

1. When presented with a set of test questions subsequent to having read a brief related article, the mean total comprehension score of adults will equal or exceed the mean total comprehension score of college students.

2. When presented with a set of test questions subsequent to having read a brief related article, the mean comprehension score of males will equal or exceed the mean comprehension score for females.

Content of the articles used in the test instrument was taken from issues of *U.S. News and World Report*, *Newsweek*, and *Reader's Digest*, 1979-80. Each of the 10 articles contained from 120 to 150 words, and was followed by 4 multiple choice questions and 1 open-ended question. Comprehension skills tested for included: (1) main idea; (2) correct details; (3) inferences, and (4) conclusions or judgments. Participants were instructed to read each article carefully, and to answer the first four questions by placing an "X" in the box opposite the best answer. Additionally, they were told to complete every fifth item by adding words or phrases to present a reasonable judgment or conclusion.

To prevent the adverse effect of the time variable, participants were instructed to take as much time as needed for completion of the questionnaires. Carlson (1949) and Rankin (1962) reported studies which found that the imposition of time limits which do not permit slow readers to finish answering questions, obviously favor the faster readers on the comprehension scores. Concurring in this notion, Webb (1966) suggests that the time element, together with such other factors as lack of familiarity with tests, with the materials, and the novelty of a test-taking role, tend to depress responses and may be selectively biasing for participants of different educational levels.

Comprehension was measured as the number of correct responses on each of the comprehension skills and the total.

#### Findings and Discussion

One hundred seventy-five questionnaires were presented to out-of-school adults for completion, and of this number 109 were returned in usable condition. This represents a return of 62%. The college students were presented 97 questionnaires, and all (100%) were returned in usable condition.

Of the total number of questionnaires presented to out-of-school adults, 150 were mailed and 25 were delivered directly to managers in business ( $N = 35$ ), industrial ( $N = 45$ ), and religious organizations ( $N = 29$ ) for use by their salaried personnel. College students were administered the questionnaire during a regular class session. The number of male participants were: industry with 28 or 62% of the total of 45; religious groups with 20 or 69% of a total of 29; business with a total of 17 or 49% of a total of 35.

The highest number of females returning usable questionnaires were from business for a total of 18 or 51% of 35. Next highest were participants from industry with a total of 17 or 38% of 45 in that group. Only nine females returned usable questionnaires from religious organizations. Five of the 25 persons who accepted hand-delivered questionnaires were visited at least three times to retrieve them. Each time the persons either stated that they forgot them, or they did not have time to complete them, while at least two dozen of those who received mailed questionnaires telephoned to say that they were still working on them and would mail them in, even beyond the deadline given them.

#### Results

*Hypothesis I.* The scores for the 109 adults ranged from 90 to 54, with a mean of 75.9 and a median score of 76, while for the 97 students the range was from 64 to 26, with a mean of 46 and a median of 48. Results of a  $t$  test indicated that the mean difference was significant at the .01 level.

*Hypothesis II.* The scores for the 65 adult males ranged from 90 to 62, with a mean of 74.89. The scores for the 46 college males ranged from 64 to 32 with a mean of 48. This difference computed by  $t$  test was significant at the .01 level.

The scores for the 44 adult women ranged from 84 to 54, with a mean of 72.63. The scores for the 51 college females ranged from 60 to 26 with a mean of 44.12. This difference computed by  $t$  test was significant at the .01 level.

There were no significant differences between adult males and adult females or college males and females on comprehension scores. When questions were analyzed by type, there was little variation among adults. For students, however, there was great variation. In general, students were able to answer questions concerning the Iranian crisis better than the energy crisis. They could answer stated main idea questions, but not implied main ideas, and if one of the response foils was a direct statement from the text, that response was more likely to be selected whether it answered the question or not. Inference and generalization questions were all poorly answered.

#### Conclusions

As shown in Table 1, adults indeed read and understand newtype items better than students. This is a disappointing finding, since college students are among our best hopes for future leaders. The results may be due in part to several factors, among which are: (1) level of interest; (2) level of

experience; (3) lack of prior knowledge on the part of students; (4) problems with reading; and, to some extent, (5) educational level and socio-economic status combined. It should be noted that people in business and industry are salaried, and are constantly in an environment which is stimulated by talk of current events. An implication for teachers in college reading laboratories would seem to be that more materials of current news-types should be required of students. Additionally, more direct instruction in answering questions of an inferential nature should be provided. Further research is needed on methods which best facilitate this type of skill.

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 Vol. 115, 1979, pp. 72-76 — *Reader's Digest*

Table 1

## COMPREHENSION SCORES OF ADULTS AND STUDENTS BY SEX

| ADULTS |           |             | STUDENTS |           |             |
|--------|-----------|-------------|----------|-----------|-------------|
| Scores | (f) Males | (f) Females | Scores   | (f) Males | (f) Females |
| 90     | 1         | 0           |          |           |             |
| 88     | 3         | 0           |          |           |             |
| 84     | 4         | 1           |          |           |             |
| 82     | 7         | 1           |          |           |             |
| 80     | 6         | 6           |          |           |             |
| 78     | 7         | 8           |          |           |             |
| 76     | 10        | 6           |          |           |             |
| 74     | 8         | 2           |          |           |             |
| 72     | 12        | 7           |          |           |             |
| 70     | 2         | 2           |          |           |             |
| 66     | 3         | 2           |          |           |             |
| 64     | 0         | 3           | 64       | 1         | 0           |
| 62     | 2         | 3           | 62       | 0         | 0           |
| 60     | 0         | 0           | 60       | 1         | 1           |
| 58     | 0         | 0           | 58       | 4         | 0           |
| 57     | 0         | 2           | 57       | 0         | 0           |
| 56     | 0         | 0           | 56       | 2         | 4           |
| 54     | 0         | 1           | 54       | 5         | 3           |
|        |           |             | 52       | 4         | 6           |
|        |           |             | 50       | 8         | 4           |
|        |           |             | 48       | 2         | 5           |
|        |           |             | 46       | 1         | 2           |
|        |           |             | 44       | 4         | 4           |
|        |           |             | 42       | 4         | 4           |
|        |           |             | 40       | 4         | 3           |
|        |           |             | 38       | 3         | 3           |
|        |           |             | 36       | 1         | 4           |
|        |           |             | 34       | 1         | 1           |
|        |           |             | 32       | 1         | 3           |
|        |           |             | 30       | 0         | 1           |
|        |           |             | 26       | 0         | 3           |



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# TEACHING READING DISABLED STUDENTS TO READ FOR MEANING: A RESEARCH STUDY

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At the Child Study Center of Peabody College of Vanderbilt University, a study was conducted to investigate whether a selected teaching strategy would increase reading comprehension of a group of remedial readers. The Child Study Center is an institute for graduate and undergraduate students enrolled in education, special education and psychology programs. One aspect of the Child Study Center program is an after school remedial reading tutorial program for school age children. Both pre-service and in-service teachers are tutors for this program.

For the purpose of this study, reading comprehension was defined as the meaningful interpretation of written language through an interactive process (Adams, Anderson and Durkin, 1977; Adams and Collins, 1977; Cary and Smith, 1978; Smith, 1979). In order for comprehension to occur, the reader must be able to extract grapho-phonetic, semantic, and syntactic cues from the text, interpret these cues and construct meaning by integrating the textual information with previous knowledge.

The conflicting dichotomies of "good" and "poor" readers or "good" and "poor" comprehenders influenced the research questions of this study. Golinkoff (1975-76) reviewed the literature which characterized good and poor comprehenders and concluded that there may be multiple types of poor comprehenders. Her conclusion seems to be important to consider when investigating the conflicting lists of characteristics. For this study it was recognized that there would probably be more than one profile of characteristics of the poor comprehender; yet, it was helpful to study these identified characteristics as possible indicators of comprehension and related problems of the selected remedial readers.

Goodman (1973) described poor readers as those who overrely on phonics or those who are too concerned with word accuracy even when meaning is lost. He further described poor readers as those who have a high frequency of correcting miscues which do not affect the meaning. Perfetti (1977) and Golinkoff (1975-76) reported that poor comprehenders have limited decoding skills which hamper the process of reading for meaning. They indicated that poor comprehenders fail to self-correct according to meaning because they are so concerned with the correct pronunciation of words rather than relying on semantic, syntactic, and contextual information.

Conversely, Jenkins et al. (1980) described good readers as good "hypothesis testers" who are flexible in their use of word analysis skills. Good readers are often described as sophisticated guessers who use cues productively (Samuels, Begy & Chen, 1975-76). Wheat and Edmonds (1975), purported that proficient readers have learned to increase their use of non-visual cues (syntax and semantics) and decrease their use of visual cues (grapho-phonics). Beebe (1980) found that self-corrections based on meaning and the use of syntactic-semantic cues were important predictors of reading comprehension.

The role of semantic and syntactic cues in fluent reading and reading comprehension has been the basis for much controversy. Several reading authorities differentiate good and poor readers according to their use of contextual information (Goodman & Goodman, 1977; Guthrie, Seifert, Burnham & Caplan, 1974; Smith, 1975; Weinstein & Rabinovitch, 1971). Others have argued that virtually all readers, regardless of achievement, employ semantic cues and that other factors account for achievement differences (Allington, 1978; Allington & Strange, 1977; Kolars, 1975; Weber, 1970). Allington and Strange (1977) found that poor readers ignored the grapho-phonetic cues in text but used syntactic and semantic information more often than did good readers who seemed to be more constrained by the visual information.

Context, semantics, and syntactic cues are not the only set of cues which readers need, but the interaction of various skills and abilities seems to be the answer. Dahl and Samuels (1977) illustrated the interactive nature of skills when investigating the hypothesis test training method in which teaching students to use a combination of semantic, syntactic, and grapho-phonetic skills produced significant achievement. Research seems to be needed which will further investigate intervention methods designed to develop the reader's strategy for employing various cue systems.

The one strategy which has been used most often to assess, monitor, and/or teach the use of context cues is the cloze procedure. Guthrie et al. (1974) found the maze technique, a variation of the cloze, to be a sensitive indicator of comprehension and a method to monitor comprehension instruction. Ammon (1975) concluded that cloze can encourage children to generate words which meet the syntactic and semantic constraints of the sentence. Children trained in cloze

### Method

**Subjects** To investigate these questions, we conducted a pilot study with a group of fifth graders described as remedial readers. Fifth graders were chosen as it was felt that students at this level would have been introduced, at least, to the use of various cue systems to decode words (e.g., grapho-phonetic, semantic, and syntactic), and initial testing could determine which cues, if any, these children were using. The sample consisted of 20 children referred to the remedial reading tutorial program at the Child Study Center. The age range of the group was 9 to 11 years with the mean age 10 years, 4 months.

**Procedure** Upon entry into the program all children were randomly assigned with replacement to either the treatment or control group. All students were pre- and posttested on the *Gilmore Oral Reading Test* (Form C & D, respectively), *Stanford Diagnostic Reading Test — Literal and Inferential Comprehension Subtests* (Form A & B respectively), *Children's Attitude Toward Reading Test* (CHART), *Reading Miscue Inventory*, and *Woodcock Reading Mastery Test — passage comprehension subtest* (Form A & B, respectively). The tutors for the project were also randomly assigned with replacement to one of the two groups. The tutors and students were unaware that they were placed in the treatment or the control group.

Prior to the study, 20 pre-service teachers enrolled in an advanced reading methods course entitled "Remedial Reading and Practicum" were selected to be the tutors for this study. All tutors completed the course before the study was implemented. All tutors were taught to administer and analyze children's oral reading on the *Reading Miscue Inventory*. Evaluation of their performance yielded a reliability estimate of .94. The tutors assigned to the experimental group were taught how to develop the selected teaching activities and were provided a script to follow for the teaching procedure. During the interventions these tutors were observed (through one-way mirrors) by external evaluators who found little or no deviation from the script, with a reliability estimate of .96.

There were 14 sessions in the total study. Four sessions were used for pre- and posttesting with 10 sessions for the intervention. At each of the 10 teaching sessions, the experimental group received the teaching activity for no longer than 30 minutes and the regular remedial reading program. The control group received the regular remedial reading program. The regular remedial reading program was defined as the diagnostic prescriptive program planned according to the initial assessment information. All tutors analyzed the pretest data and, with the assistance of a supervisor, planned appropriate goals and implemented programs to enhance students' learning needs. There was no control placed on which goals were selected; but goals were selected according to pupil need. Therefore, students in the control group could (and did) receive help in semantic and syntactic cues but would not receive the specific treatment activity to teach these skills. Likewise the children in the experimental group could also receive additional practice with semantics, syntax, or cloze passages if it was determined that these were the skill needs.

**Materials** The teaching activity consisted of four parts. The first three parts were referred to as the *three paragraph activity* which was followed by a cloze passage. To develop each teaching activity, passages were selected from the Holt, Rinehart, Winston (1977) basal series at the second, third and fourth-grade levels. Each selection was divided into a 250-word passage taken from the "middle" of the story and the

three preceding paragraphs. These three paragraphs were used to develop the following activities:

are better able to predict what an unfamiliar word might be since they are accustomed to using semantic and syntactic cues and would then need to look only for phonic cues to confirm the "guess." Scheneyer (1965) found that students make use of context cues when they are provided with feedback on the accuracy of choices for cloze passages and the opportunity to verbalize reasons for choices.

These descriptions and findings lead to several research questions. Can poor readers be trained to increase their use of semantic and syntactic cues? Will specific training develop flexibility in the use of several cues based on meaning information? Will increased and efficient use of semantic, syntactic and self-correction cues effect the nature of miscues and reading for meaning?

**Research Design** A pretest—posttest control group experimental design was employed. The time of the sessions and the amount of sessions per student were held constant across both groups. Each tutor of both groups received equal conference time with the supervisor. All tutoring sessions were held under the same conditions, e.g., size of tutoring rooms, amount of observation time. All children were enrolled in the after school reading program which met two days a week for one hour each session.

A. Sentences were selected from the first paragraph to provide practice in syntactic paraphrasing.

e.g., Sally hit the ball. The ball was hit by Sally.  
Sally was hit by the ball.  
Sally was hit ball by.

B. Phrases or short sentences which provided practice of the semantic and syntactic cues of plurals, adverbs and adjectives, and prepositions were selected from the second paragraph.

e.g., She then climbed up \_\_\_\_\_ ladder to reach  
(this, these, shoe)  
all \_\_\_\_\_ apples that were on \_\_\_\_\_  
(the, drop, these)  
tree.

C. The third paragraph was used to provide a forced-choice cloze passage with every fifth word deleted and a set of words to be chosen for the deleted word. The choices for these words were: correct word, incorrect word but same from of speech, or incorrect word and different part of speech.

e.g., She then climbed up \_\_\_\_\_ ladder to reach  
(th's, these, shoe)  
all \_\_\_\_\_ arples that were on \_\_\_\_\_  
(carry, that, those) (the, drop, these)  
tree.

These activities were followed with the 250-word cloze passage which had the first and last sentence intact and every fifth word deleted in the remainder of the passage. No words were provided as choices for the deleted words. With each of these activities, the tutor followed the script to provide immediate feedback on the accuracy of the responses, encourage "guessing for what makes sense," demonstrate models of meaningful answers and elicit verbalization by the student to explain the "guess."

### Analysis of the Data

A one way analysis of covariance was conducted on a selected number of variables. The posttest scores were ad-



justed on the basis of the covariate (pretest) to control statistically any initial differences on the pretests which might confound the posttest differences between the two groups of students. It was found from the pretest data that several students in the experimental group scored at the lower limits of the reading test scores which made the groups different rather than equivalent.

**Results** Analysis of the descriptive data indicated that there was great variability among the entry performance of the remedial readers. We found that the poor readers in our sample differed from each other in their use of various cue systems without any discernible pattern of characteristics of poor readers. For example, the range of use of self-corrections varied from 0-44%, semantic cues use varied from 0-44%, syntax use varied from 25-75%, graphic cues use varied from 15-17%, and phonic cues use varied from 25-75%.

The results of the statistical analysis indicated no significant differences ( $p < .05$ ) in performance across the Miscue Inventory or Gilmore variables. The groups did not perform statistically different as a result of direct instruction in the selected areas. Both groups made significant gains on selected variables within each group as determined by individual *t*-tests; the experimental group made greater gains in raw score and percentiles than the control group but the between group analysis indicated that the "greater gains" were not great enough to produce significant gains at the .05 level.

Trends toward significance on two variables were found which seem to warrant further investigation. These two variables were on the Reading Miscues Inventory, and under the categories of: use of semantic cues and use of meaningful self-corrections. For semantic cues, the *F* value was 1.796, *df* /17,  $p = .19$  which indicated that 4 out of 5 times the use of semantic cues increased because of the treatment. Comparing the means on pretest and posttest change, the experimental group moved from the 50%ile to 75%ile while the control group changed from the 52%ile to the 65%ile. The direction of change was positive for both groups but the treatment group did better. With the use of meaningful self-corrections, computed *F* values was 1.855, *df* 1/17,  $p = .19$  which indicated that 4 out of 5 times the use of meaningful self-corrections increased as a result of the treatment. A comparison of the means on pretest and posttest change showed that the experimental group moved from the 9%ile to the 30%ile while the control group went from the 18%ile to the 22%ile. Again the direction of change was positive for both groups but the treatment group made a greater gain.

### Conclusions and Recommendations

The trends may reflect regression toward the mean by the lower scoring readers in the experimental group. Also, the group were not statistically accounted for by the treatment. The treatment of the experimental group may not have been different enough to differentiate its effect on performance. The trends may reflect regression toward the mean by the lower scoring readers in the experimental group. Also, the children in the control group who scored somewhat higher on pretest data may have progressed at greater rates. Further data analysis will be conducted using multivariate analysis to determine possible effects of variables on each other and multiple discriminant analysis to determine possible predictors of high and low readers. Follow-up studies will attempt to match groups by specific criteria in addition to randomized group assignment.

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## REACTION: TEACHING DISABLED STUDENTS TO READ

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Victoria J. Risko and Paul S. Redelheim present a refreshing series of procedures designed to enhance reading comprehension. They report the results of a study made to ascertain the value of three types of teaching strategies as avenues for increasing reading comprehension. The strategies employed were syntactic paraphrasing; semantic and syntactic cues of plurals, adverbs, and adjectives and prepositions; and forced-choice cloze procedure.

Reported preparation of teachers in terms of both diagnosis and methodology appears to be adequate. Examples given to illustrate means of developing each teaching activity may well serve as models for the development of teacher-made materials to be used in various content lessons.

Supportive research for the experiment included 25 studies. As the review progressed, several questions emerged which formed a base for this investigation.

Subjects were selected from the fifth grade level under the assumption that these children have been introduced to the various methods of word attack. All children had been recommended for remediation in reading.

The design of the research was well-planned and includes the generally accepted components, such as (1) randomly assigning subjects to all treatments, (2) control and experimental groups randomly assigned, (3) statistical analyses used are reasonably related to measurement employed, and (4) care seems to have been exercised to limit generalizations to population of their original sample.

Even though the results of the greater gains of the experimental group over the control group were not significant at the .05 level, the combined results may have implications toward utilization of such instructional strategies with other children demonstrating deficiencies in comprehension. The results indicated that both groups made significant gains on selected variables, with the experimental group making greater gains in raw scores and percentiles than the control group.

Further investigation was suggested for two variables specified. Other conclusions to consider are that some regression toward the mean may have been reflected by lower scorers in the experimental group. Follow-up studies are planned to include matched groups by specific criteria.

Possible suggestions for replication might include a study which specifies and includes the interactive skills mentioned in this report along with syntactic, semantic and context clues. Attention might be given to an in-depth analysis of each subject's specific needs as related to comprehension.

To summarize, the writers have provided three types of exercises which have potential for helping students obtain higher achievement levels in comprehension than those who may not have been guided to the point of error.

## THE NEED FOR A DIAGNOSTIC/PREScriptive INSTRUCTIONAL SYSTEM

WILLIAM F. WHITE  
Morehead State University

Morehead State University is a complex regional institution in the Eastern part of Kentucky. The enrollment for the 1980-81 academic year was 7,100 students. This fall we generated about 184,000 credit hours with an FTE faculty of about 300, teaching in 152 academic programs.

There are eight universities in Kentucky. The University of Kentucky and University of Louisville are major universities, and Morehead State is one of the regional universities. All eight universities in Kentucky have open admissions for in-state students. This means that any student graduating from an accredited secondary school in Kentucky will be admitted into any of the eight institutions. However, this does not mean that a student can get into any program he desires. There is selective admission criteria in medicine, nursing, engineering, veterinary technology, and other areas.

Given the open door admissions policy of the State of Kentucky, and given the fact that the effects of economic deprivation are moderate to severe in the Eastern Kentucky region, we must be concerned about the identification of strengths and weaknesses of each individual student who enters Morehead State University. Because of the severe economic deprivation in homes, families, and school systems, a higher incident of developmental lag is evidenced in reading ability, mathematics skills, written composition skills, and communication or speech patterns among high school seniors, than is average across the country. Based on ACT scores of each individual student, standardized tests of achievement, diagnostic tests in mathematics, reading, and compositional practice, it is reliably estimated that 30-35% of our entering freshmen and transfers have at least moderate developmental lag. If we were to define developmental lag, we would characterize the behaviors to be below the 25th percentile on standardized tests of reading and mathematics abilities. Some of the most difficult data to handle reflects reading levels of the second, or third grade level, and basic inability in computation and concepts of mathematics. Our research conclusions indicate that where there is developmental lag, it is multidimensional. If it is in reading, it is also in math and writing skills as well.

As you would expect, attrition in the student population has been very high at Morehead State University until recently. Our data, which we are using to analyze the past situation, has been very poor. We have not clearly separated out determining variables such as two-year students from four-year students, and we have some difficulty in identifying stopouts and other characteristics. We still are talking about a student dropping out for a semester instead of perceiving him as transferring for a semester. Students should be perceived as coming and going and matriculating. Our data does show that our retention of undergraduate students from 1975-1979 was in the neighborhood of 32%. This means that 68% of the names of entering students in 1975 were not among the graduating class in 1979. Nineteen percent of dropout students came back to MSU to continue their education. There are some indicators to infer that our retention for four-year students is about 42-45%.



Confronted with the serious impact on freshmen classes by students with serious developmental lag, faculty have been fearful about the effect of "flunking out" students who are apparently unable to compete in the college curricula. Many faculty feel that standards should give way to continuous employment contracts. The State of Kentucky gave us \$17,000; we used it to fund a position in developmental reading. This became a hard money position after one year. We wrote a proposal for Strengthening Developing Institutions Program grant and were funded. Our total expenditure in our developmental model is about \$1,400,000.

#### A MODEL FOR INDIVIDUALIZING THE ACADEMIC PROGRAM

**WANDA D. BIGHAM**  
Morehead State University

During the late 1970s, several indicators caused Morehead State University faculty and administrators to become concerned about its students' academic success and retention. Among these indicators were:

1. Between 1973 and 1978 the mean ACT composite score of entering students declined from 18.1 to 15.9.
2. During the 1977-78 academic year, 49% of new freshmen had composite ACT scores in the range of 1-15 and 5% scored in the range of 26-36.
3. Graphs comparing total enrollment based on the number of students enrolled and on full-time equivalency (FTE = 16 credit hours) for the period from 1973 to 1979 indicated a general increase in headcount through 1978 although FTE had peaked in 1975.
4. Follow up reports after four years indicated that in 1973 to 1975, the percentages of freshmen who did not enroll for the sophomore year were, respectively, 54, 50, and 59%. The graduation rate after four years was 30 to 31%.
5. Achievement tests administered to 378 sophomore and junior applicants for the Teacher Education Program produced the following mean scores: reading, 12.4 grade level; mathematics, 11.3; and language, 11.5.

Because of several concerns (that both the gifted and the academically deficient students had needs which were not being met, that academic standards needed to be maintained or improved, and that the threat of declining enrollment could be offset by improving retention) it was determined that an individualized academic system would be implemented at Morehead State University.

Although the university had programs serving small groups of students identified as academically talented, probationary, or academically and economically disadvantaged, it was apparent in the data that large numbers of students needed special attention in order to reach their educational goals. For this reason, it was determined that a *system* rather than a *program* would be implemented. Using this approach, most of the faculty will be oriented and involved in the process of improving undergraduate education and services. In selected departments, basic skills and advanced courses will be developed, and the faculty who teach those courses will be assigned to and hold rank in the appropriate academic departments. The responsibility for coordination of the University's efforts to individualize the academic program rests with the Director of Instructional Systems who reports to

the Vice President for Academic Affairs. Components of the system, which are described briefly below are: (1) the instructional system for individual differences; (2) the advising system; (3) the learning system; and (4) counseling services.

#### Instructional System for Individual Differences

The instructional system is responsible for identifying needs and implementing courses which will individualize the academic program for our entering students. Initially, our emphasis has been placed on the development of basic skills courses because remediation of academic deficiencies has been identified as our students' greatest need. In the future, we expect to expand our offerings for the gifted and talented. Although some in this category are presently involved in the academic honors program, we believe it is necessary to do a better job of identifying and encouraging those who have creative as well as academic talents.

During the 1980-81 academic year, basic skills offerings include developmental reading, two courses comparable to two years of high school algebra, a five-day composition course, and a study skills course. Plans for the 1981-82 academic year call for the development of a pre-college composition course and auxiliary writing labs to supplement either that course or the regular composition course. In addition, it is our hope that a speech correctionist will be employed to assist in the screening an instruction regarding clear speech patterns.

Criteria for placement at the various levels of skill development in mathematics, reading, and written composition have been determined by personnel in those specific areas with input from the Directors of Testing and Instructional Systems, the Developmental Studies Advisory Committee, and the Vice President for Academic Affairs. In each case, multiple criteria (e.g., ACT scores, high school grades, self-assessment of skills, inventories, and proposed programs of study) are used by advisors to determine placement.

#### Advising System

Once the courses have been developed and placement criteria have been determined, the key to individualizing the academic programs is an effective advising system. Because advising has traditionally been identified as the prerogative of the faculty and because school administrators and faculty consider this an important part of their responsibility, an expanded faculty advising system, rather than a center, has been implemented. Department chairpersons who have been oriented to the system and to the high priority to be placed on good advising, select faculty members to advise. These individuals and other interested individuals—department chairpersons, school deans, and academic counselors—meet periodically for training regarding advising responsibilities, advising techniques, and placement criteria.

Outstanding advisors from each school have been identified to receive reassigned time and special instructions regarding the advising of "undeclared" students. Students who are undecided about a major are assisted in the selection of courses which are of interest and/or which satisfy general education requirements. Initially, they were assured that it is all right to be "undeclared," and they are offered assistance with the development of educational goals.

In order for advisors to perform their duties in a responsible manner, it is necessary that they have timely and accurate information regarding their advisees. Therefore, an essential component to the success of this effort is the development of an information system for the advising and

monitoring of all our students. In addition to assisting advisors and students in the development of class schedules, the system facilitates closer supervision of those students classified as high risk due to skill deficiencies or other factors.

### The Learning System

The purpose of the learning system is to provide alternative strategies for instruction. This effort is being carried out in learning labs, both centralized and in selected departments, and through diversification of classroom materials and teaching styles.

The centralized and departmental labs provide a variety of materials which may be used to reinforce or supplement classroom instruction. Included are audio-visual and auto-tutorial packages, a variety of printed materials, programmed texts, and computer-assisted instruction which may be used independently or in combination with assistance from peer tutors or lab instructors.

Opportunities for faculty developed classroom materials and diversified teaching methods are provided through the Faculty Fellowship Program. Reassigned time, consultant assistance, and small supplementary budgets are available to faculty members who compete successfully through proposals which identify instructional problems and which outline acceptable solutions. Through this procedure 22 proposals affecting the same number of classes in six departments have been funded since January 1980. In addition to the worth of these projects to the students in those classrooms, there has been a valuable spin-off effect as faculty have not only received an opportunity to develop materials of interest to them but have also gained recognition and praise for their efforts.

### Counseling Services

Although Morehead State University is in the early stages of developing a counseling center which will include both therapeutic and informational counseling, it is important to note that the plan for all counseling services—through dormitory personnel, advisors, and academic counselors—is seen as an integral part of a system which individualizes the college experience. Because research indicates that the combination of counseling and remediation is more effective than remediation alone, a close working relationship between personnel who provide counseling and those who teach developmental courses is being developed. Although we give a high priority to this combination of services, we expect a similar concern to exist on an individual basis between counseling personnel and any advisor, instructor, or dormitory staff member who observes that a student is experiencing problems.

Sensitivity to the total student and his or her cognitive and affective needs, motivational factors, personal problems, past experiences in educational settings, and environmental factors will, we believe, result in more productive, better integrated, and better satisfied individuals.

### AN INDIVIDUALIZED READING PROGRAM FOR COLLEGE STUDENTS

**WILLIAM C. HAMPTON**  
Morehead State University

Individualized reading instruction is provided for college students at Morehead State University in a course called Developmental Reading. Even though the course is called Developmental Reading it is both developmental and

remedial. It is developmental in that several of the students in the classes are not retarded readers, but they are there to improve their reading ability. It is remedial in that a greater number of the students are retarded readers and must be retaught the reading skills they have not mastered. The greater number of students presently enrolled in the course would score at or below the 9th grade level on the Nelson Denny Reading Test and have obtained a composite score of 14 or less on the A.C.T. There are a few students in the classes that would score in the 90th percentile on either of these tests. The individualized approach lends itself to meeting the needs of the students at all levels.

In an attempt to identify students who need help in reading if they are to have a measure of success in college courses, the University has established criteria for placement in Developmental Reading. If the student has a G.P.A. of 2.4 to 3.1 and an A.C.T. composite of 14 or below, or a high school G.P.A. of 2.3 or below, it is strongly urged that he be advised to enroll in the course. In instances where this data is not available, the student is required to take the Nelson Denny Reading Test. If he obtains a score of 9th grade or below, he is urged to enroll in the reading course.

In addition to those students who are identified as retarded readers, some programs such as pre-med, and pre-nursing require the Developmental Reading course. Also, students may on their own volition enroll for self improvement.

There are 14 sections of Developmental Reading being taught this semester. The students meet on a regular schedule of two hours one week and three hours the next week for the entire semester. The enrollment is limited to 15 per class where practical. There are three classes that have exceeded that number this semester, but no class has more than 19 students.

There are seven faculty members teaching in the program. Three have earned doctorates and two others are presently enrolled in the doctoral program at the University of Kentucky. All seven faculty members have completed advanced courses in reading, and three of the seven have taught on the secondary level. The faculty members also teach methods courses in reading in addition to their assignments in Developmental Reading.

Diagnostic procedures are begun the first day of class. This year the California Achievement Test is being used. The California Locator Tests were first administered to determine which level test was to be given. This was done in an attempt to avoid frustration for the weaker students and give some challenge to the stronger students. The students were then given the C.A.T. on either level 17, 18, or 19, depending on their score on the Locator Test. Level 17 is intended for grades 6.6-7.9, level 18 for 7.6-9.9, and 19 for 9.6-12.9. An item analysis was done in order to identify the specific areas of strengths and weaknesses of each student.

The student, in a one-on-one conference, was made aware of his performance on the test. A contract was made and the student placed in material that was deemed most appropriate. A wide range and variety of material is available in the Reading Center, but there is a heavy reliance on workbooks and kits. The materials relied on most heavily are *Word Clues* by EDL, *Specific Skills Series* by Barnell Loft, *Increasing Reading Efficiency* by Holt, Rinehart, and Winston, *Times Readings* by Jamestown Publishers. Machines, such as the Controlled Reader are used, but primarily for motivation.

In an attempt to determine the student's perception of the University, and in particular the reading course, an attitude scale was developed. This instrument was administered in the fall and spring semesters of 1979-80. Results obtained on this instrument indicated that the students have a positive attitude toward the University and toward their reading course. A vast majority, 85% of the students indicated that they would



recommend Developmental Reading to their friends. Sixty-six percent of the students indicated that the course helped them to take reading more seriously.

New materials and approaches are currently being tried as the search continues to make the course more effective.

### RESEARCH COMPONENT OF THE MOREHEAD STATE UNIVERSITY DEVELOPMENTAL STUDIES PROGRAM

LINDA A. HIGGINBOTHAM  
Morehead State University

This section of the related Morehead program papers is composed of four primary areas: (1) the extent of academic deficiencies of entering students, (2) the characteristics of students taking reading classes, (3) the pre- and post-test results of students in reading classes, and (4) the grade point average of these students and its relationship to continuous enrollment.

#### Extent of Academic Deficiencies

Students having an ACT composite score or an individual area score at or below 12 are described as being academically deficient. The University receives additional funding from the Kentucky Council on Higher Education for students admitted with ACT composite scores of 12 or below—259 students for the 1979-80 school year.

Inspection of the data indicate that 24% of the Fall 1979 entering students for whom ACT scores were available were academically deficient in English, 47% were deficient in mathematics, and 46% were deficient in reading. As would be expected, a higher proportion of students with ACT composite scores of 12 or below were academically deficient while lower proportions of students with ACT composite scores above 12 were deficient. The following deficiency percentages were recorded for students ( $N = 730$ ) with composite ACTs above 12: English, 65, 9%; mathematics, 229, 31%; reading, 216, 30%. Combining all ACTs produced the following percentage deficiency pools: English, 241, 24%; mathematics, 460, 47%; reading, 455, 46%.

An examination of multiple areas of academic deficiencies may provide a better indication of the extent of deficiencies for the 1979-80 entering student population reporting ACT scores (see Figure 1). Of students with ACT composite scores of 12 or below, 54 percent were academically deficient in all three areas (English, mathematics, and reading) and 27 percent in two areas (mathematics and reading). The extent of academic deficiency for students with ACT composite scores over 12 was 32 percent in mathematics only, 28 percent in reading only, and 23 percent in both of these areas.

#### Student Characteristics

For the fall semester of 1979, 209 students enrolled in Reading I classes and 15 students enrolled in Reading II classes. In the spring semester of 1979, Reading I had 67 students and Reading II had 42 students. Most of the students in Reading I and Reading II classes for fall and spring semesters of 1979 were freshmen, 18 years of age, white, resided in Kentucky, and came from numerous feeder high schools. The sex distribution was about equal for females and males. All six colleges of the institution had majors enrolled in reading classes.

#### Pre- and Post-Test Results

Completed pre- and post-test scores were available and are as follows:

|       |                        |
|-------|------------------------|
| 80% + | Fall 1979 Reading I    |
| 47% + | Fall 1979 Reading II   |
| 69% + | Spring 1979 Reading I  |
| 90% + | Spring 1979 Reading II |

Although complete test scores on the reading students were much lower than desired, overall attendance was good. The average number of days absent for each group was four.

Statistically significant gains between pretest and posttest scores were found when  $t$  tests were computed for students in Reading I classes for the Fall 1979 semester on the easy ( $t = -8.49$ ,  $p < .01$ ) and hard ( $t = -9.82$ ,  $p < .01$ ) passages of the reading rate scores, skimming and scanning scores ( $t = 8.25$ ,  $p < .01$ ) and total scores ( $t = 6.02$ ,  $p < .01$ ) on the McGraw-Hill Basic Skills (standard scores with a mean of 50 and standard deviation of 10). For the Reading II students, gains were evident on both reading rate scores and retention scores: easy,  $t = 2.83$ ,  $p = .025$ ; hard,  $t = 3.65$ ,  $p = .008$ ; and retention,  $t = 2.57$ ,  $p = .037$ . Skimming and scanning, paragraph comprehension and total score were non-significant.

The  $t$ -test results from the pre- and post-test scores on the California Achievement Test (Level 19, grade equivalent scores) for students taking Reading I and II classes during the Spring 1979 semester were computed and found to show significant differences. Significant gains were found for Reading I ( $N = 4$ ) students on vocabulary scores ( $X_1 = 10.6$ ,  $X_2 = 11.3$ ,  $t = 2.61$ ,  $p = .012$ ); comprehension ( $X_1 = 10.0$ ,  $X_2 = 10.9$ ,  $t = 4.49$ ,  $p = .001$ ); and reference ( $X_1 = 10.5$ ,  $X_2 = 11.1$ ,  $t = -2.74$ ,  $p = .009$ ). Significant gains were found for Reading II students ( $N = 38$ ) on vocabulary grade equivalent scores ( $X_1 = 8.7$ ,  $X_2 = 9.8$ ,  $t = -3.09$ ,  $p = .004$ ); comprehension ( $X_1 = 8.13$ ,  $X_2 = 9.5$ ,  $t = -3.38$ ,  $p = .002$ ); and reference ( $X_1 = 10.00$ ,  $X_2 = 10.8$ ,  $t = 2.76$ ,  $p = .009$ ).

#### Continuous Enrollment

The current and cumulative grade point averages for students in the Fall 1979 Reading classes and the grade point averages of these students the following Spring 1979 semester are revealed in Table 1. Also included are the current and cumulative grade point averages of the students in the Spring 1979 Reading classes as well as their previous semester grade point averages. The current and cumulative grade point averages for all four groups of students over the two semesters were above the probation level of 1.50 GPA.

Sixty percent (126 out of 209) of the students enrolled in Fall 1979 Reading I classes and 53% (8 out of 15) of the students in the Fall 1979 Reading II class enrolled at Morehead State University one year later for the Fall 1980 semester. Note that the Fall 1979 Reading II class only consisted of 15 students and one of these students graduated Fall semester. Fifty-five percent (37 out of 67) of the students taking Reading I classes during the Spring 1980 semester enrolled at Morehead State University for the Fall 1980 semester. Of the students who took Reading II classes in the Spring 1979 semester, 81% (34 out of 42) enrolled at Morehead State University for the Fall 1980 semester.

Preliminary evaluation of the reading classes indicates that participation in the program apparently has beneficial results in helping to overcome developmental lag. Continuous monitoring of the program is planned.

**Table 1**  
**Student GPA'S For Fall 1979 And Spring 1979 Semesters**  
**And Enrollment In Fall 1980 Semester**

|                | FALL 1979           |                     | SPRING 1979         |                     | FALL 1980  |           |
|----------------|---------------------|---------------------|---------------------|---------------------|------------|-----------|
|                | Current GPA         | Cumulat. GPA        | Current GPA         | Cumulat. GPA        | Enrolled   |           |
| READ I (1791)  | X = 2.02<br>n = 209 | X = 2.02<br>n = 209 | X = 1.98<br>n = 173 | X = 2.17<br>n = 173 | Not at MSU | 83 (40%)  |
| READ II (1792) | X = 2.44<br>n = 15  | X = 2.51<br>n = 15  | X = 2.32<br>n = 12  | X = 2.53<br>n = 12  | At MSU     | 126 (60%) |
|                |                     |                     |                     |                     | Not at MSU | 6 (40%)   |
|                |                     |                     |                     |                     | At MSU     | 8 (53%)   |
|                |                     |                     |                     |                     | Graduated  | 1 ( 7%)   |
| READ I (2791)  | X = 1.84<br>n = 45  | X = 1.88<br>n = 48  | X = 1.78<br>n = 67  | X = 1.73<br>n = 67  | Not at MSU | 29 (43%)  |
|                |                     |                     |                     |                     | At MSU     | 37 (55%)  |
|                |                     |                     |                     |                     | Graduated  | 1 ( 2%)   |
| READ II (2792) | X = 2.08<br>n = 41  | X = 2.03<br>n = 41  | X = 2.10<br>n = 42  | X = 2.04<br>n = 42  | Not at MSU | 8 (19%)   |
|                |                     |                     |                     |                     | At MSU     | 34 (81%)  |

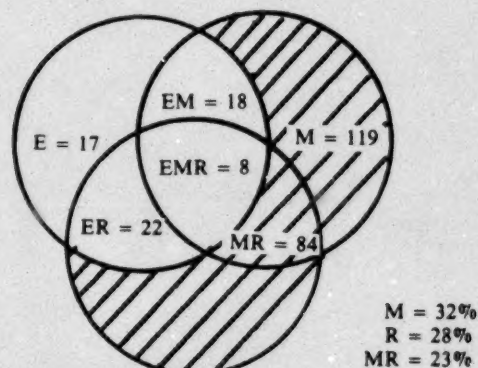
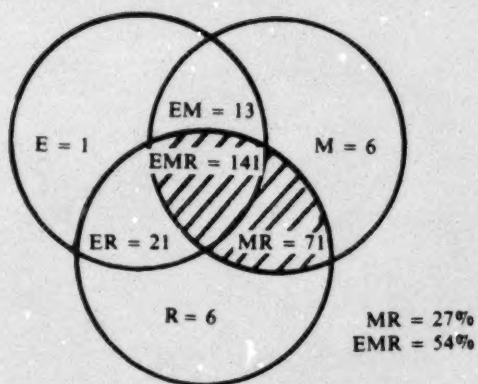


**Figure 1. Students with Academic Deficiencies When ACT Composite Scores Were Split at 12.**  
 E = English, M = Mathematics, R = Reading  
 DS = Developmental Studies



# THE DIAGNOSTIC PRESCRIPTIVE INFORMATION SYSTEM MODEL FUNDED BY TITLE III UNDER THE STRENGTHENING DEVELOPING INSTITUTIONS PROGRAM

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Research indicates that persistence in college is viewed as a function of the degree of harmony between the student and institution's environment (Cope & Hannah, 1975). More specifically, if a student is fully integrated into the social and academic systems of a college or university, then presumably that student will have more positive perceptions of the institution's environment, participate more extensively in social activities, and perform at a higher level of academic achievement (Tinto, 1975). Research on student retention indicates that attrition is heaviest during the freshman year (Eckland, 1964; Marsh, 1966; Rootment, 1974). Since 1970, Morehead State has, through various projects, addressed the problems of identifying and advising high risk students, that is students most likely to drop out. These projects, however, were limited to serving a minimal number of students. Since Morehead State University is, by legislative action, an open-door institution, graduates of accredited Kentucky high schools must be accepted without examination or exception. The result has been that a large number of academically deficient students have been enrolled.

The steady decrease in academic competence (as measured by the decline at the institution in the composite ACT scores for entering freshmen since 1973, the unfavorable comparison with national ACT mean composite scores) and the degree of economic disadvantage of the institution's clientele indicated the need for an innovative comprehensive approach which would provide complete advising and assessment coupled with developmental education programs addressed to the needs of all students.

## Content

A diagnostic prescriptive information systems model was designed and submitted for Title III funding under the Strengthening Developing Institutions Program. In October, 1979, Morehead State University was awarded a four year grant. During 1980, the four subsystems in the model have been in the planning and implementation stages. These subsystems include: (1) developmental studies system which consists of reading, written composition, mathematics, and oral communication, (2) learning systems, (3) advising systems, and (4) an information feedback system for evaluation purposes.

Although evaluation has been ongoing, the statistical analysis data is merely preliminary at this time. The effect, however, of the 1979 planning and implementation year centers around awareness. Although developmental classes in reading and written composition were offered in earlier years, services were limited. During the past year, the awareness of the value of these programs has increased.

Research studies have shown that effective reading is necessary in order for any person to succeed in college. It is difficult when students must read to learn but have not learned to read. Developmental reading on the higher level has been and still is on the defensive. Reading is an integral part of the broader educational program and should share the responsibility for communicative development. Courses in English, social studies, science and mathematics require a student to spend much time applying study skills in reading textbooks, references, and related materials. Hence, skillful

reading and academic success tend to go hand in hand. It must be emphasized, however, that despite Morehead State University's recognition of the necessity for corrective work, our developmental reading program (and other developmental services) on campus aim to help all students make steady progress in the sequential acquisition of reading skills. This is evident, for example, by the developmental reading course requirement (in the pre-med program curriculum).

The Morehead State University faculty is aware of the increasingly large number of high school graduates going on to college and that the demands on reading ability made by college textbooks are great. College students benefit from reading programs geared to their developmental needs because special reading skills and abilities are necessary for effective reading in particular content fields; and, basic conditions of learning through reading is important to teachers of all subjects. That is if common conditions are ignored, the more specialized reading skills cannot be soundly developed.

At Morehead State University students of varied abilities benefit from the individualized nature of the program which is geared to their various developmental needs. Students with their advisors often follow-up the basic reading course with Developmental Reading II. Subtle implications of impact of the developmental reading program is displayed by the high retention rate of students who completed the program—approximately 83%. Total campus increased from five in the fall of 1978-79 to 15 in the fall of 1979-80 and from five in the spring of 1978-79 to nine in the spring of 1980. In 1980-81, a total of 28 courses (Developmental Reading I and II) were offered in the fall and 22 courses in the spring. Enrollment in the classes as reflected in spring 1981 pre-registration show 60 students enrolling for Developmental Reading I and 53 enrolling for Developmental Reading II for a total of 113. (Maximum 15 students each class.) After the fall semester of 1980-81, 54 students were identified as needing to initially enroll in a reading class. Sixty-seven students were identified as needing additional skill development. It is expected that the pre-registration spring enrollment figures of 113 for Developmental Reading will reflect the placement of a number of the 121 identified students as needing the course. This indicates advisor awareness, student satisfaction, and program impact across campus.

The Department of Mathematics, and Languages and Literature have expanded developmental work in the areas of written composition; and the Department of Communication in the area of normal or clear speech patterns. These efforts indicate support for and continuation of the developmental movement on campus. The concerted efforts of these departments to provide comprehensive programs for building skills displays the general concern of both faculty and administration for focusing on individual needs, self-paced individual achievements, for adjusting instruction to the student's mode of learning and specific skill needs. Teachers and advisors seek to provide the opportunity for students to acquire needed skills and to achieve individual goals. It is believed these will lead to the satisfaction, extension, and enrichment of students' interests and personal and social development. A flexible, continuous and comprehensive developmental studies system encompassing diagnosis and remediation in the major academic areas is apparent by developing on campus.

The faculty of mathematics has supported the contention that many of the failures in mathematics are caused by the inability of students to read and understand mathematical discussions as well as problems and exercises. After identifying entry level competencies of prospective students in mathematics, the faculty has developed and implemented, in

the past year, a developmental studies program for those students needing assistance in algebra. A self-assessment profile sheet involving attitude, background, and ACT score in mathematics to assist the student and advisor in selecting the proper course in mathematics was utilized upon initial advising contact. This profile, has assisted in the prevention of mistakes in under-placement as well as over-placement. General mathematics and computational courses also have been developed to meet the needs of students who need remedial work in arithmetic.

The model which this department has chosen for the developmental classes in developmental mathematics involves the following ideas. A computer assisted learning laboratory in which modules in beginning and intermediate algebra has been made available for use by students. Students follow a self-paced approach using softback consumable exercises and tests. Assistance is given by an instructor, by peer tutors, and by the tutor laboratory. Microcomputers also are available. Assistance has been available to students from 9:10 a.m.-3:00 p.m. during the day, and several hours each evening.

Students usually work in pairs at the microcomputers. The microcomputer is chosen for its graphics capability and reliability. Computer programs which combine instruction in technique with practice have been developed. The anticipated goals include speed of problem presentation, active involvement by the student in the teaching-learning process, avoidance of intimidation by a person whose skills greatly exceed those of the student, repetition of instruction without impatience, motivation of the student by animation, and assured activity in the instruction process. The progress of each pair of students is monitored daily and made available to the instructor; thus, the instructor has information concerning the progress of every student.

Entrance and exit into these courses may occur at varying times during a semester. Based upon the results of a pre-test and post-test, a continuous program is outlined for students determining the prescribed modules and time requirements for completing the course. The results of the post-test is analyzed statistically to determine the effectiveness of the program. Records to track students' progress is kept by computer.

During the past semester, approximately 250 students were identified with a limited 200 students being served in the developmental mathematics classes. This included variable entry which added two class sections. Continuous counseling of student progress was necessary, and an in-progress grade was given if a student failed to complete the course within a particular semester. Preliminary figures indicated a 10% attrition rate for the students enrolled in the developmental mathematics classes.

It is possible for a student to complete both courses during a single semester. However, this sort of progress is rare, perhaps due to a lack of motivation and/or the newness of this type of instruction. Scales to measure attitude and motivation in the self-paced programs are being developed.

Although the written composition faculty efforts were initiated some years ago they have now developed plans for change. A proposed course of action will include the implementation of a basic writing skills course which will become part of the University's developmental studies system. This will replace the remedial component of the present English class. The rationale for the new course is different. The course will cover somewhat different material than was previously emphasized and will cover it with thoroughness. Placement will be determined on the basis of ACT scores and/or performance on the Morehead State University Written Composition Test, developed locally. Flexible

placement will be possible. This course will carry three hours of elective credit, but these hours will not satisfy the General Education requirement in written composition.

The course is designed for the student who is not sufficiently prepared to enter the usual college English Composition course. Major emphasis is on writing and revision. Grammar, punctuation, and mechanics will be reviewed but such a review will not be the main component of the course. Reading assignments are used to build both active and recognition vocabularies and to improve the skills of critical reading and written response. Laboratory assistance as in the case of reading and mathematics also is available. The exit requirements are the satisfactory command of grammar and mechanics; ability to compose satisfactory paragraphs according to recognized patterns of development.

The Teacher Education Council, the Department of Education, the Department of Communication, in the area of speech has developed a program to assess students in normal and clear speech patterns. This program has not yet been implemented. However, it is recommended that every teacher education candidate be required to take the Teacher Education-Speech Screening Test and three hours of Speech unless exempted from enrolling in a speech class. Each candidate will be administered the examination during in-class sessions of Education Foundations. The examining panel will consist of a speech therapist and two of the speech instructors and the examination will normally take two class hours. Students will be tested in terms of listening, voice production, and oral organization/clarity.

In summary, a definite faculty awareness of developmental needs exists at Morehead State. The faculty has made provisions and has adjusted programs to deal with difference in rates of learning, and to assist each student to develop a pattern of learning that is individually appropriate and beneficial. The subsystem described as "Learning Systems" provides an opportunity for the faculty to develop instructional innovations made available through reassigned time and faculty fellowships. Motivation is apparent and through this opportunity faculty is developing innovative programs and courses designed to meet individualized student needs. Efforts include the development and adjustment of present materials and methods to fit students' learning modes. Proposals have been received from all departments including science, mathematics, computer programming, English composition, special education, and psychology. Quick assistance modules are available for students entering advanced classes.

Faculty has become more aware of the importance of advisement as exemplified by the coordination of efforts to identify students with specific needs, to make special placement, to track and monitor student progress, and refer to appropriate support services.

There is a need to develop a system that allows faculty to do advising activities well and the advising system has been developing a design that will allow advisors to have more positive impact on the development of the student experiencing difficulties. An advisor has the option of making appropriate referrals to the student support system which includes such special units as counseling, career planning, study skills, cooperative education and, learning laboratory assistance. All of these units show evidence of increased use.

The advising system also is making progress in providing opportunities for students to select and plan their education programs, evaluate their own progress, and to identify their own special learning needs. Efforts are being made to maintain an appropriate balance in each group without one area taking precedence over another. It has been determined that the impact on the majority of faculty across campus as to



the goals of developmental advising will require multiple approaches over a period of time. However, the efforts which have been made to disseminate useful material and involve faculty in the decision making progress has been successful. On-going faculty advising committees have been formed and are actively addressing concerns such as philosophy, accountability, reward system, policies, training, information flow, student orientation, continued evaluation, manual information, ACT results, faculty and student needs.

The fourth subsystem is that of information feedback. This includes evaluation which presently deals with (1) academic deficiencies; (2) determination of needs; (3) advising survey; (4) development of student data files; (5) evaluation in content areas; and (6) preliminary retention data. Evaluation continues to document impact. Effective communication flow across campus is also addressed in the feedback system.

An additional impact has been the assistance of consultants. Consultants have provided an important diverse view of campus activities. As a result, modifications have been suggested from a distinctively different point of view. Workshops on the development of instructional modules, library skills courses, etc. gave opportunity for all to become involved and, increased campus awareness. These workshops were very successful indicated by high faculty attendance. Hence, some of the workshops were sometimes unprepared to accommodate the large unexpected numbers.

The total developmental effort on campus has made a significant awareness impact. Much of the campus has been re-acquainted with the emphasis that must be placed on the concept that learning is a process as opposed to a subject oriented approach. Active involvement has been evident and consequently progress has been significant.

#### **REACTION: THE MOREHEAD STATE UNIVERSITY PROGRAM**

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The Morehead State University program to overcome educational developmental lag described in this symposium is not only bold but probably is unique. Remedial programs in reading, English, and mathematics have been around for a long time. Recently, there has been a flurry in prestigious universities to organize so-called special studies programs to assist minority and culturally disadvantaged students adjust to the demands of the university. At Morehead State, however, the entire university seems to have been mobilized to achieve the desired goals.

White's paper describes the necessity for individualizing a university's offerings to better meet the needs of Appalachian students. Bigham presents a system, now operating, which encompasses the vision and hopes for restructuring a whole university, with all its diversity, in order to individualize the educational experiences of entering students. Often we hear administrators and faculty decry entrance standards and wish for more rigorous selection criteria. What is exciting at Morehead is a willingness to accept open admission and to honestly and forthrightly deal with it. In many universities compromises are made and new departments or units are organized and staffed by student oriented personnel whose sole mission is to assist the less than able student. It is significant at Morehead that the academic departments play a central role in adjusting academic offerings. It is even more interesting when we note that the English department and the mathematics department, units not generally regarded as demonstrating flexibility, have taken leading roles.

Hampton describes a college reading program that is not too dissimilar from others. It is organized as a course. As such it has limitations. Students seek grades, they tend to equate it with other course offerings and expect to put in just so many hours of work. The Morehead group have attempted to modify the restrictions imposed by having administrators view it as a course. Provisions are available for the student to re-enroll in another course should he make less than optimal progress. Class size also is restricted. Hampton failed to mention grading problems; a thorny issue in college-adult reading. One positive aspect of the Morehead program is that non-retarded students, i.e. pre-med and science majors enroll in reading. This policy may go a long way in preventing the courses from being stereotyped as "dummy" ones.

As seven different teachers handle sections there undoubtedly are some differences in attitudes toward and interest in the program. As the teachers also teach pre-service and in-service teachers there may be some who do not regard college reading as significant as these other duties. Such attitudes may show up in differences in the amount of time spent in individual conferences and special assignments with those enrolled in the reading classes. By and large the students showed positive reactions to their experiences. In the future it is suggested that the survey be made anonymous and perhaps administered by a person other than the teacher.

Blong's paper describes the important components of liaison and coordination which are basic to the efforts to involve the total university community. English and mathematics have developed good approaches to academic offerings. Little was mentioned, however, of efforts being made to help all members of the faculty to improve their teaching and advising. One gathers from Blong's discussion that to date, selected faculty, those most concerned, have developed new diagnostic and individualized approaches. It is hoped that in future reports attention is given to methods employed to spread the efforts throughout all ranks and departments. If successful, the effort and methods will be widely studied and imitated at other institutions.

As is usual in complex changes, evaluation is difficult. Higginbotham presents data which reveal the extent of the educational deprivation of entering freshmen. These data are presented in her text, and Figure 1. She devotes the balance of her report to reading. The data are fairly typical of college reading classes. Students improve significantly in rate but not significantly in comprehension. Perhaps, the new methods being developed by the reading instructors will focus more on comprehension and cognitive abilities. Probably the skill emphasis in the reading courses needs to be accompanied by massive efforts to enrich the overall cultural and informational experiences of the students.

#### **COMPUTER ASSISTED INSTRUCTION: AN INNOVATIVE APPROACH TO THE DEVELOPMENT OF COMPREHENSION AT THE COLLEGE FRESHMAN LEVEL**

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The "quasi-open door" admission policy at Alabama A & M University (AAMU) makes it possible for students of a variety of backgrounds to enter college. In order to satisfy its needs for accountability for those students, AAMU provides intensive support to assist the students in overcoming handicaps to educational progress. These efforts have especially

focused upon the weaknesses of freshmen students in the area of basic skills.

A large number of the students who enter under the present admission policy have not mastered the proficiency level of reading skills necessary to cope with the requirements of the college learning environment, especially with regard to reading, thinking, and study skills. For example, most of the 682 freshmen who entered the University in the Fall of 1979 needed some assistance in reading as determined by the *Nelson-Denny Reading Test*, which is used for screening purposes. Those students with weaknesses in reading were required to enroll in the Reading Course during the school year.

A major goal of the AAMU Reading Program is to correct reading and study skill deficiencies before the students are overcome by the demands of college level work.

Assistance in reading is not available to these students other than through Freshman Reading.

The Reading Program is presently operating at full classroom capacity with freshmen students currently receiving three 50-minute periods of classroom instruction per week. Because of the wide range of individual differences in cultural and experiential backgrounds, general achievement, and varied learning modalities, it is a great challenge to overcome years of accrued reading deficits. It is a fact that most students show substantial improvement by as much as two to four years growth in a single year.

Currently, instruction in the reading course is provided through the use of approximately 30 non-computerized instructional modules which have been developed to improve a variety of reading skills. These skills include: vocabulary, comprehension, critical reading, study skills and rate of comprehension.

The non-computerized modules are designed to include: a title; brief general description; statement of objectives; pre-test; text; practice exercises and post-test. Each module is designed to have three levels: Level A is prepared for the lowest level students with reading grade equivalents of 6, 7, and 8 as determined by the *Nelson-Denny Reading Test*. Level B is the middle level prepared for students with grade equivalents of 9 and 10. Level C is the highest one for students with a reading grade equivalent of 11.

Following the initial assignment to a section of Freshman Reading, each student completes background information forms, interest inventories, writes an introspective essay and has an initial conference with his/her instructor. All students are then given the *Stanford Diagnostic Test* to further diagnose strengths and weaknesses in reading. Next, each person is given an assignment sheet which lists all of the non-computerized modules which the student needs to complete in the course. The course work may extend for two semesters for some students. Upon completion of the course, each person receives a letter grade and three hours of course credit.

In a typical class session, the students enter the reading lab and remove their module assignment sheet from their activity folders. Next, they select the appropriate materials to be used in the completion of their work. Some of the modules are designed so that all of the information necessary for their completion are contained within the modules themselves. Others require workbooks, tapes, kits, machines or other resources for their successful completion. The instructor is available to help the student in locating the necessary materials, to clarify directions, and to provide any other assistance needed.

When they have selected their modules, the students then proceed to work through the activities at their own pace. Each module is designed to develop one skill, and usually requires

2-3 hours for completion. Modules which have been completed are placed in a box for the instructor to grade and return to the student. If a student has not achieved at least 70% mastery of a particular skill, he is required to work through the module again.

The present problem is that, due to large numbers of students in the classes, the instructors have limited time to work with individuals to insure that the remedial modules which they complete have been clearly understood. Those students who do not have at least 70% mastery of the modules are required to work through them a second time. During this process there is little or no constant interaction between instructors and students nor does time permit enough drill to be given until 100% mastery has been achieved. This results in some students achieving complete mastery while others achieve partial mastery of skills to be developed in the course.

It is believed that CAI modules will remedy the existing problem. With CAI, learning will be further enhanced through immediate feedback relating to appropriateness of each response. As each response is evaluated, the student advances step by step toward the mastery of skills. At each step appropriate instructions are given to the student related to his level of performance. If necessary he may be requested to do additional reading of text material or he may be referred to his instructor. Repeated drills in skill areas may be provided for those who need additional practice.

Instruction is presented in small, well-defined units which are less intimidating to students than large blocks of material.

Because of the needs of freshmen students who entered AAMU, it was decided that, rather than attempt to adapt materials which had been developed at other institutions, CAI modules appropriate to the needs of this student population would be developed.

This endeavor was undertaken as part of a three-year National Science Foundation Project at AAMU. The NSF CAUSE Grant provided for the purchase of a PDP 11/70 computer from the Digital Equipment Corporation and 12 interactive cathode ray tube terminals.

As the authors prepared to develop the initial computer assisted instructional modules in reading, it was determined that, because of the needs of the students, the best place to start was with the comprehension skills, especially the location of main ideas in paragraphs. It has stated that one of the many skills a good reader develops is the ability to recognize and understand the main idea or central thought of material he has read. The exercises in *Breaking The Reading Barrier* by Gilbert were chosen because of their previous use with AAMU students. It had been determined that these exercises were very effective in helping the students to understand main idea patterns in paragraphs.

The first CAI module was a general one in which an overview of the course and specific course objectives were given. The module included a list of the CAI modules which will eventually be available to the students in the area of comprehension.

The second module to be developed, and the focus of this research project was entitled, "Reading For the Main Idea In Paragraphs." The objective for the module was:

Upon completion of this module the student should have improved his ability to recognize and understand the central thought or main idea in paragraphs.

The module was divided into three segments, as required by standard CAI module format. In segment 1, a pre-test followed the statement of the title and objective. This test was designed to measure the student's ability to identify the main idea in a paragraph prior to completing it. Moreover, it had



been previously determined that all students needed this skill.

Segment 2 of the module contained the text. In this section, the rationale for distinguishing the main idea from supporting details was given, in addition to clues to the location of the main idea. Then an example of each of the five paragraph patterns was presented.

Segment 3 of the module was the test section in which ten paragraphs were given for practice in identifying the main idea. The number of correct responses, the number of trials and the percentage of accuracy were given for the ten paragraphs. Eighty percent mastery was considered satisfactory.

Five interested students from three of the reading classes were introduced to the CAI module which was developed. Each person sat at the terminal console and typed a response to the questions asked by the computer. The students' responses were evaluated and appropriate directions were given as they completed the three segments of the main idea module. The terminal presently available with the PDP 11/70 is of the tele-type, which required the student to read the information from a printed sheet.

A 13 item questionnaire related to the students' experience with the CAI module was developed for evaluation purposes. Each student completed this questionnaire upon completion of the module.

Although the results are not conclusive because of the small sample, the students responses provided interesting aspects of using CAI for reading skills development at the college level. The results were as follows:

Most of the students responded favorably to their learning experience with CAI and felt that there was a net gain in the ability to identify the main idea in paragraphs.

The students like the CAI module for its drill and directions for finding the correct answer.

It appears that CAI can be fruitfully used to provide individualized experience in reading skills development to supplement the classroom instruction.

Future progress will be presented after the completion of the modules in this area and their evaluation.

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### REACTION: INNOVATIVE APPROACH TO COMPREHENSION AT THE FRESHMAN LEVEL

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The effort to get reading CAI modules designed and tested at Alabama A & M University by Professor Thompson and his associates (described in the previous paper) is in many ways typical of such efforts at colleges and universities around the United States. One common factor is outside funding, in this case an NSF grant. A second common factor is the use of CAI to meet basic skill goals for which the college or university is held accountable by its governing body. It is also typical that the reading specialist involved in such an effort has little or no previous experience with computer-assisted instruction. Each one must be innovative.

#### Innovative programs in CAI-reading are much alike

The sequence of events is almost always the same. The call for proposals is sent out; a proposal is drafted and mailed; funds are allocated; computers become available, and then a reading specialist is involved. Seldom is the computer or its author languages (those with which it can be programmed) determined by the reading specialist who is asked to make use of it. Consequently, the reading specialist must be familiarized with the capabilities and limitations of the computer already selected—before he or she can select or design the software to be presented and/or managed by the computer, and before he or she can investigate alternatives such as the purchase of ready-to-use CAI programs.

The choice of topics is also quite predictable. Comprehension is the major problem for college students requiring remedial reading instruction, and the most needed type is comprehension of the main idea. Shaw (1961), many years ago, maintained that Brooklyn College students' greatest reading difficulty was in stating main ideas. Banks (n.d.), in an effort paralleling Thompson's, chose as her first CAI lessons a set designed to help students learn to select main ideas for paragraphs.

Another predictable event in CAI efforts is the decision to create a drill-and-practice program. Nearly every college or university computer center has developed or purchased some one or another course-authoring program. Such a program, once called up, asks the programmer to type in (1) the passage to be read, (2) the questions to be asked, (3) the right answer, (4) several distractors or wrong answers, and (5) a reply to be printed or displayed by the computer for each right or wrong answer chosen by the student. Course-authoring programs also usually include text-editing features which enable the programmer to change answers and correct errors (debug the course) without retyping the whole section.

In the case of the CAUSE grant to AAMU, certain advance

work made it easier for Thompson and his associates to begin their tasks than it might otherwise have been. Since computer-assisted instruction is *always programmed instruction*, and since programmed instruction requires pre-stated behavioral goals, the goals developed for AAMU's reading modules could be used without change. Furthermore, the division of the course into 30 modules, of three reading levels each, also was an event that would have to have been accomplished before computerization if it had not already been done. In addition, mastery levels (80%) had been set and pretests and posttests had been developed.

Consequently, the initial CAI effort required only the development of an introductory unit including a list of the lessons among which the student is to choose (or from which the instructor may prescribe) and the various units or lessons themselves, which may be added as they are made functional. Thompson's presentation indicates that he and his associates have accomplished the first task (the introductory unit) and the second (converting their main idea module to a CAI-reading lesson) in a manner that is satisfactory to their students. It appears probable that they will go on to complete their tasks in the next two years of their funding.

#### Alternatives should be explored

During the past decade a number of other colleges and universities have tried computer-based reading instruction and a great deal has been learned about it. Herlin, Bance and Hansen (1976), for example, have pointed out that their critical reading course, when computerized, was more effective for slow-moving students than for quicker ones. Kahn's (1980) investigation found that students preferring highly structured instruction benefit more from CAI-reading lessons than others who prefer less structured (and more personalized) lessons. One of the most sobering findings, however, is the tremendous amount of time required for creating, field-testing, and de-bugging computerized lessons. Mason and Blanchard (1979) reported that at one time an estimated 400 hours were required for the creation of one hour of CAI. However, Chapp and Wye (1969) estimated that only about 254 hours would be required for their production of one hour of CAI reading instruction.

With such expensive production estimates, one must wonder why the purchasing of programs is not a more-frequently chosen alternative (Mason, 1979). Several companies market CAI instruction which could be used (or modified to use) in college remedial instruction. Among these are the Computer Curriculum Corporation, the Control Data Corporation, and the Time Share Corporation. Furthermore, recent agreements between education publishers and computer manufacturers suggest that additional computerized reading programs will soon be available.

Another alternative is to try computer-management (CMI) of reading instruction for college students. Numerous colleges (Randall, 1972) and universities (Oosterhof, 1977) have done so, many with commendable success. The decision to use the computer to test, score, recommend or prescribe instruction, evaluate progress, and keep records is usually welcomed by overworked college reading instructors (who sometimes find that getting a computer-managed program started involves more recording than their usual work). However, colleges contemplating the development of their own CMI reading programs should be aware that such programs can now be purchased from companies such as Educational Progress Corporation and Learning Unlimited.

#### Much remains to be done

While it is possible that AAMU (or any other college or

university initiating computer-based reading instruction) could have purchased the CAI or CMI reading programs which they decided to create themselves, it may well be that their decision will prove to be the correct one. As more colleges and universities design computer-based instruction to fit their very own needs, more knowledge is amassed and more programs are available for newcomers to choose from. With each new attempt, our technological knowledge base is expanded.

Thompson and his associates have learned much from the work they have done thus far. Perhaps the greatest benefit of their innovative project will be not the resulting CAI reading program, but rather the knowledge (about developing such programs) that his group can share with others in their own academic community, with other specialists in reading, and with others in the field of computer-based instruction. Consequently, the true value of this (and other innovative efforts) may be impossible to ascertain.

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#### USING ADVANCED ORGANIZERS IN THE CLASSROOM

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It has been 20 years since David Ausubel (1960) published his first account of the use of advance organizers. In his latest major publication (Ausubel, Novak, & Hanesian, 1978), he finds it hard to understand the criticism of his colleagues and the lack of empirical support for the advantages of using such a strategy to promote meaningful verbal learning. Even taking into consideration the 10-year lag estimated to exist between the formulation of educational theory and basic research and applications of that theory and research in classrooms, it does seem that the use of advance organizers is long overdue.



Given the rapid rise and fall that is characteristic of many educational practices, one wonders why the concept of advance organizers is still viable. And it is viable, judging from the number of recently published journal articles, research reports, and educational texts which deal with the concept. After a brief explication of the centrality of advance organizers to Ausubel's theory of meaningful verbal learning, this paper will explore some possible reasons for the lack of empirical support and present guidelines and practical suggestions for the construction and use of advance organizers in classrooms at various age levels. According to Ausubel et al. (1978):

Meaningful reception learning involves the acquisition of new meanings. It requires both a meaningful learning set and the presentation of potentially meaningful material to the learner. The latter condition, in turn, presupposes (1) that the learning material itself can be nonarbitrarily (plausibly, sensibly, and nonrandomly) and substantively (nonverbally) related to any appropriate cognitive structure (possesses "logical" meaning) and (2) that the particular learner's cognitive structure contains relevant anchoring idea(s) to which the new materials can be related. (p. 38)

Of the two conditions set forth, Ausubel and his colleagues assert that the second, the existing structure of the learner's knowledge at the time of learning, is the more important. This is succinctly stated as follows: "If we had to reduce all of educational psychology to just one principle, we would say this: The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly" (p. 163).

Once the teacher has ascertained the state of the learner's knowledge (a difficult task to which Ausubel devotes little space), the principle teaching strategy recommended for the deliberate manipulation of the learner's cognitive structure so as to enhance meaningful verbal learning is the use of "appropriate relevant and inclusive introductory materials (organizers)" (p. 170). These organizers are to be used in advance of the learning experience in order to establish a meaningful learning set and to "bridge the gap between what the learner *already knows* and what he *needs to know* before he can meaningfully learn the task at hand" (pp. 171-172). Contrary to summaries and overviews, advance organizers should be at a higher level of abstraction, generality, and inclusiveness than the new material to be learned. This will provide the "ideational scaffolding" or superordinate ideas under which the new subordinate ideas may be subsumed.

Ausubel's theory is inherently logical. It is well established, both from empirical studies and our own knowledge of the world, that the acquisition and retention of large bodies of subject matter knowledge are impossible without the ability to abstract and classify. Lawton and Wanska (1977) stated that "it is impossible to disprove the existence of the single crucial cognitive variable in the theory—that is, stable, clear, hierarchically organized subject matter knowledge" (p. 239). It then follows that a teaching strategy (e.g., advance organizers) designed to facilitate the hierarchical structuring of knowledge should promote learning. Yet, the empirical research has failed, for the most part, to confirm this.

Barnes and Clawson (1975) reviewed 32 studies, including those by Ausubel and colleagues, and found only 12 that showed significant results in favor of the use of advance organizers. Baker (1977) analysed 52 studies since the early work of Ausubel; a majority of them were non-supportive. A number of investigators have proposed possible explanations. The one most frequently encountered is the lack of an operational definition of an advance organizer, one which would provide criteria and examples so that a panel of impartial judges could identify an advance organizer (Barnes & Clawson, 1975). Ausubel has been criticized for vagueness and ambiguity in terminology (Rickards, 1977) and for not

providing specific examples. In defense, Ausubel has replied that he devoted 23 pages of his 1968 publication to the nature and definition of advance organizers, including a discussion of how to construct one on a specific topic. This reviewer, as well as others (Hartley & Davis, 1976; Thelen, 1976; Vacca, 1978), has searched in vain for the "how to" discussion. General suggestions can be found, but specific examples are lacking in Ausubel's text.

However, if one reexamines Ausubel's two criteria for the presentation of potentially meaningful material, and if one remembers that the second criterion, the existing structure of the learner's cognitive structure, is the more important, it then becomes obvious that any given advance organizer can only be illustrated in terms of the cognitive gap it is designed to bridge. One may describe the building of bridges in general, or the building of specific types of bridges, but the specifications for a particular bridge will depend on the width of the chasm to be spanned and many other factors. Or, if the metaphor of an advance organizer as ideational scaffolding is carried a bit farther, one does not erect scaffolding for a particular building without a blueprint of both the foundation and the completed structure. A perusal of the research on advance organizers reveals an appalling lack of attention to (or, at any rate, lack of reporting of) the existing cognitive structures of the learners in the experimental and control groups. Statements abound such as, "It was believed that . . ." and "It was assumed that . . ." such-and-such a cognitive state existed in the subjects. Information from pretests or other pertinent data which would indicate the learners' existing cognitive structures were not given in the majority of the reports. Thus, several researchers (Jones, 1979; Lawton & Wanska, 1977; Mayer, 1979a; Meyer, 1979) have hypothesized that perhaps advance organizers failed to result in significantly improved learning either because the learners were able to provide their own subsumers or because the organizers were not sufficient to bridge the gap.

The second major reason proposed for the lack of empirical support has been the failure of most studies to analyze results in terms of what kind of learning took place (Christie & Schumacher, 1976; Mayer, 1979a). Most studies measured overall retention. Ausubel's subsumption theory predicts that the retention of conceptual ideas will be enhanced by the use of advance organizers but the retention of technical details will not. Measures of overall amount retained will not be sensitive to the selective effects. In his review of 50 published advance organizer studies, Mayer (1979b) found none which used a dependent measure that analyzed retention into individual idea units. In a recent study, Mayer and Bromage (1980) demonstrated qualitative differences in learning rather than a simple overall difference.

A third reason for the lack of empirical support for the use of advance organizers has recently been investigated by Luiten, Ames, and Ackerson (1980). Instead of classifying advance organizer studies into those finding statistically significant and nonsignificant results as Barnes and Clawson (1975) did, Luiten et al. examined 135 published and unpublished studies of the facilitative effect of advance organizers on learning and retention, using the meta-analysis technique proposed by Glass (1978). This technique enables researchers to quantify, standardize, and average treatment effects across studies of a similar type. All effect sizes, regardless of magnitude, are thus included. Using this technique, Luiten et al. found that the average participant receiving the advance organizer treatment performed better than 58% of control group individuals, indicating an overall small facilitative effect on learning and retention.

At what age level or stage of cognitive development may advance organizers be used? Although the early studies by

Ausubel and many subsequent studies were conducted using college students as subjects, advance organizers have been used successfully with nursery age children (Lawton & Ershler, Note 1), preschoolers and kindergarteners (Lawton & Fowell, 1978; Swadener & Lawton, 1977), elementary students (Lawton, 1977; Lawton & Wanska, 1979), and secondary students (Hall, 1977; Jones, 1979). On the other hand, few investigators have considered Piaget's stages of cognitive development in relation to the use of advance organizers. Lawton and his colleagues at the University of Wisconsin have been the principle researchers. They have presented evidence of logical operations by 6-year-olds, indicating that the teaching of high order concepts accelerated their progression from the preoperational to the concrete operational stage of cognitive development (Lawton, 1977). A study currently being conducted by Nielsen (Note 2) at the University of South Florida is investigating the possible facilitation by advance organizers of the transition of seventh graders from concrete to formal stages.

With what kinds of subject matter may advance organizers be used? The answer is any body of subject matter which has a systematic overall structure. This would include almost all of the school curriculum; highly structured disciplines such as science, math, and social studies are fertile fields for the use of advance organizers. In the review by Barnes and Clawson (1975) 30 of the 32 studies had been conducted in these three disciplines. The interpretation of literature might be considered a less fertile field. However, the recent work of schema theorists (Anderson, 1977; Kintsch, 1977; Rumelhart & Ortony, 1977) suggests that advance organizers ("story schema") may profitably be used in this field also.

How are classroom teachers going to construct advance organizers, lacking an operational definition and few concrete examples from research? Fortunately, the literature has provided some guidelines. According to Ausubel et al. (1978), advance organizers should have the following characteristics: (1) They should be more inclusive, abstract, and general than the learning material they precede in order to provide a framework for the stable incorporation and retention of the more detailed material to be learned. (b) They must take into account the relevant existing ideas that students have about the topic. This means that the level of abstractness and generality can only be determined in relation to the capabilities of the learners; e.g., the concept, "dog," may be abstract for a 2-year-old. (c) They must demonstrate the relationship between the ideas learners already have and the new ideas to be learned. (d) If the learners have few relevant existing ideas, the advance organizer needs to be more expository in nature; i.e., teachers will need to provide more informational framework, being careful, however, to use terminology familiar to the learners. (e) If the new material can be related to a cognitive framework already possessed by the learners, the advance organizer should be comparative in nature. It is then used "to integrate new ideas with basically similar concepts in cognitive structure and to increase discriminability between new and existing ideas that are essentially different but confusably similar" (Ausubel et al., 1978, p. 172).

Ausubel has not been specific as to the format for an advance organizer. In his studies with college undergraduates he used prose passages (approximately 200 to 500 words) which students read before reading the new material. Other investigators have used pictures (Farr, 1975), titles (Farr, 1975; Meyer, Brandt, & Bluth, 1973), single sentences (Christie & Schumacher, 1976; Rickards, 1976) graphic displays (Hall, 1977), slide-verbal presentations (Jones, 1977; Lawton & Wanska, 1979), and structured overviews (Earle, 1969; Estes, Mills, & Barron, 1969), as well as prose passages.

The structured overview would seem to hold the most promise at the present for classroom teachers who want to begin using a form of advance organizer. The use of the adjective, "structured," distinguishes this type of overview from those in general use; the latter generally are presented at the same level of abstraction and inclusiveness as the learning material which they introduce and emphasize the main ideas of that material.

As developed by Barron (1969) the structured overview purports to satisfy the criteria established by Ausubel for an advance organizer. Barron defined structure as the hierarchical ordering of principles (or generalizations), concepts, and details. To prepare an advance organizer for a specific unit, teachers must first determine the major understandings, or concepts, they wish the students to understand. Then they must determine which concepts must be "chained" to secure an understanding of the principles (generalizations) involved in the unit of study. Finally, they need to identify the pertinent details which, when classed together, form the major concept.

After teachers have identified the logical structure of the material to be learned (Ausubel's first criterion), they depict this structure in the form of a diagram or outline in terminology familiar to the students in such a way that the relationships between terms and the relative importance of terms are highlighted. This visual display is then presented to the students, accompanied by a verbal discussion. During the discussion teachers can, through questioning, discover relevant ideas students have about the topic, and then relate the structured overview to their background of knowledge, thus meeting Ausubel's second criterion. The discussion has the advantage of information-sharing by students, as well as permitting teachers to make adjustments in level of abstractness and in terminology.

Estes et al. have defined a structured overview as a "visual and verbal representation of the key vocabulary of a learning task in relation to more inclusive or subsuming vocabulary concepts that have previously been learned by the student" (1969, p. 41). They found no significant difference between the use of an advance organizer in the form of a 500-word prose passage (read silently by students) and a structured overview consisting of a series of vocabulary terms organized to depict the topic of the science unit (fungi) within a broad taxonomy. Thus, they concluded that the structured overview seemed to facilitate learning and retention as well as the prose advance organizer.

Further support for a visual/verbal advance organizer, such as the structured overview, may be found in the recent analysis of 135 advance organizer studies by Luiten et al. (1980). Their comparison of written and aural modes of advance organizer presentation revealed that the aural mode was more effective.

Earle and Barron (1973) used a six step set of directions to help teachers construct and implement a structured overview. Earle (1976) reported that teachers who used these directions found that the process helped them clarify their content objectives and helped students to see relationships between present, past, and future topics of study.

In this reviewer's opinion, the best single source for classroom teachers who wish to understand and use advance organizers is probably Eggen, Kauchak, and Harder's (1979) recent text, *Strategies for Teachers: Information Processing in the Classroom*. Chapter 7, "The Ausubel Model," describes the model in easily understandable terms, explores ways the model can be used in different subject areas and at different age levels, and gives profuse illustrations. Eggen et al. demonstrate the use of a prose advance organizer in three forms (definition, analogy, and generalization) accompanied



by a structured overview in the teaching of world geography.

It is clear from Eggen et al.'s illustrations that teachers must know the structure of their subject area thoroughly, must know what information their students already possess, and must be able to guide students in assimilating the new knowledge. This is surely what good teaching consists of. The combined use of a prose advance organizer and a structured overview would seem to facilitate both the teachers' and learners' tasks.

Up to this point nothing has been said in this paper regarding the relationship of advance organizers to the use of textbooks. The textbook continues to be the principle source of information in most classrooms. Ausubel et al. (1978) contend that most texts are not written so as to enhance the learning and retention of meaningful verbal material.

The more typical practice is to segregate topically homogeneous materials into separate chapters and subchapters, and to order the arrangement of topics and subtopics (and the materials within each) solely on the basis of topical relatedness without regard to their relative level of abstraction, generality, and inclusiveness. (pp. 190-191)

Instead, texts should have a hierarchical series of organizers. The initial ones should furnish anchorage at a global level. Each unit of material should be preceded by an organizer and the material within each unit should be presented in descending order of inclusiveness. Although topical segregation may be necessary, the relationship of each topic to the global subsumers should be emphasized. Ausubel et al. attempted to write their text in conformance with these guidelines, at the same time cautioning in a note (1978, p. 171) that the introductory statements at the beginning of each chapter were not true advance organizers for two reasons. First, the topics in each chapter were too broad and heterogeneous to be subsumed under a single advance organizer. Second, the preparation of a true advance organizer requires "specific knowledge of potentially relevant anchoring concepts in the learner's cognitive structure" (p. 171). The second reason is valid. The heart of Ausubel's model rests on bridging the gap between what the learner knows and what he needs to know. Only teachers can ascertain what their students already know before they begin to read a text.

The first reason, the breadth and heterogeneity of topics presented in the chapters, does not seem to be valid. Ausubel et al. could have provided a better example of text organization along the lines they proposed. Two more recent texts, one in the field of educational psychology (Hamachek, 1979) and one in the field of reading education (Friedman & Rowls, 1980), have better exemplified the use of advance organizers and the hierarchical structuring of their subject matter.

Obviously, the use of a text which includes advance organizers would make the teacher's task easier. Teachers would still have the responsibility for ascertaining what their students already know. Once this has been done, they could adapt, restate, explain, or make other necessary adjustments to be sure that the advance organizers will really function as such for the students with whom they are working.

#### Reference Notes

1. Lawton, J. T., & Ershler, J. *Effects of formal and informal preschool programs on logical concept learning and development: An interim report*. Paper presented at annual meeting of American Educational Research Association, Boston, April 1980.
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#### COMPARATIVE EVALUATION OF THE COGNITIVE THEORIES OF PIAGET AND AUSUBEL

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Cognition, the act or faculty of knowing, has been the object of investigation since ancient times. Two areas of cognition in particular, cognitive development and cognitive processes, have been studied extensively by biologists,

psychologists, educators, and others. Naturally, the perspective from which the investigators approach their work affects their perceptions and conclusions. Although the study of cognition has a long history, the last two decades have witnessed a revived interest in intellectual activities, especially in cognitive psychology.

In the receptive milieu created by these trends, the writing of two men have received particular attention. Jean Piaget, a Swiss genetic epistemologist, studied the cognitive development of children for more than half a century, mostly through observations of small numbers of children in natural and controlled conditions. Piaget has inferred from his observations of behavioral content that intelligence develops in the individual by invariant functions acting upon changing structures.

More recently, David Ausubel, an educational psychologist, has explored extensively the role of cognition in learning. His work has culminated in a cognitive theory of meaningful learning which he calls assimilation theory. This theory postulates that new information is linked to relevant pre-existing aspects of cognitive structure with both the newly acquired information and the pre-existing structure being modified in the process. Based on his model, he describes the cognitive process of subsumption with its underlying principles of progressive differentiation and integrative reconciliation. He sets his theory within the context of school learning and explores at length the types of meaningful reception learning which he believes form the core of the classroom experience.

Although interest in Piaget's work has been the greater of the two, both theories have generated considerable empirical investigation with mixed results. Recently a body of research has begun to accumulate which combines the two theories to generate unified, testable hypotheses. (Lawton, 1977a; Lawton, 1977b; Swadener & Lawton, 1977; Lawton & Fowell, 1978; Lawton & Wanska, 1978; Lawton & Wanska, 1979; Lawton & Ershler, Note 1). This body of related research seems to indicate that properly designed and implemented advance organizers result in enhanced learning, retention, and transfer and in accelerated cognitive development in children in the preoperational and concrete operational subperiods.

#### Theoretical Comparison and Contrast

Are the theories of Piaget and Ausubel basically compatible or do they differ on too many major issues for their ideas to be used in conjunction with one another? Answering this question is complicated by the fact that while Ausubel comments liberally about Piaget in his book *Educational Psychology: A Cognitive View*, there are no sources of Piaget's response to Ausubel's thinking. Therefore, Ausubel's perspective will be adopted in this discussion.

Ausubel primarily accepts Piaget's stage-dependent theory of cognitive development. In responding to critics of Piaget's work, he states, "Actually, developmental stages imply nothing more than identifiable sequential phases in an orderly progression of development that are qualitatively discriminable from adjacent phases and generally characteristic of most members of a broadly defined age range" (Ausubel et. al., p. 225). In his consideration of school learning, however, Ausubel eschews Piaget's complex arrangement of periods, subperiods, stages, and substages. Instead, he stipulates three general stages in children's cognitive development differing most significantly along the concrete-abstract dimension: the pre-school child can generally understand concepts only if their criterial attributes can be related to multiple exemplars of the concept before relating it to cognitive structure; the elementary school child



can understand the meaning of a concept by relating the criterial attributes directly to cognitive structure with the aid of concrete-empirical examples of those attributes; and the secondary student can understand and manipulate abstract ideas and relationships among them directly, without the benefit of concrete props (p. 206).

Although Ausubel basically accepts Piaget's theory as valid, he does take exception to some of Piaget's formulations when specifically applied to education. The points of difference he lists include: Piaget is concerned solely with the development of thoughts as opposed to comprehension; by identifying the operations of thought with the operations of logic, Piaget confuses a special tool of thought with the actual operations of thought in problem solving situations; Piaget attributes to thought the quality of implicit action in contrast to the widely accepted view of thinking as a reorganization of elements in cognitive structure to meet the requirements of a situation; Piaget places prime emphasis on endogenous motivation, largely ignoring education's role of stimulating the development of new motivations from existing potentialities; Piaget discounts education's role in promoting cognitive development, placing instead great emphasis on spontaneous or incidental experience; Piaget denies the role of education in accelerating cognitive development or in facilitating transfer from one stage to another; and Piaget believes the function of language is communicative, attributing to it no operative role in thought (p. 231).

The third issue raised by Ausubel, that Piaget conceives of thought as action in opposition to thought as reorganization of cognitive structure, represents a basic difference between the two men. Piaget emphasizes the processes of thought while Ausubel focuses more on the manipulation of content. Ausubel says the belief that "it is feasible to teach general cognitive operations isolated from actual subject-matter content not only makes excessive demands on children, but is also artificial in terms of particularized contents which such skills necessarily assume in each discipline" (p. 231). Shulman (1970), in discussing the relation of psychology to mathematics education, describes Ausubel's stance strongly: "He remains a militant advocate of the importance of mastering well-organized bodies of subject-matter knowledge as the most important goal of education" (Shulman, 1970, p. 36). In a paper proposing assimilation theory as an alternative to Piagetian psychology, Novak (1977) explores this same dichotomy by saying, "The key issue . . . is whether children develop general 'cognitive structure' or 'cognitive operations' to make sense out of experience, or, if instead, they acquire a hierarchically organized framework of specific concepts, each of which or some combination permits them to make sense of an experience . . ." (p. 455). Novak (1977) would support the latter position.

Another point of difference identified by Ausubel is that Piaget believes the most important form of motivation to be endogenous, or originating within the individual, which in turn, suggests discovery learning as the most effective type of education. While Piaget favors discovery learning for all children, Ausubel suggests that meaningful reception learning is most appropriate for children in upper elementary and secondary school who have acquired a basic conceptual store. Ausubel explains that the nature of the abstract stage of cognitive functions permits individuals to learn most new concepts and propositions directly, grasping verbally or symbolically stated relationships between previously learned abstractions. Exemplars or props are used for illustrative purposes only.

While the difference in emphasis on discovery versus reception learning by these two men is clear, their translation of the implications of formal operations for instruction is less

oppositional. In particular, the function of language emerges as an issue. Although Ausubel implies that Piaget posits that language has no operative or process role in thought, he is being overly simplistic in his interpretation. Piaget does stress that during the sensory motor period of development "representational thought does not begin with and result from the incorporation of verbal signs from the social environment" (Flavell, 1963, p. 155). Rather, symbolic representation leads to the acquisition of language. However, in contrasting his proposed active method against receptive methods, Piaget himself emphasizes that the activity need not always involve physical manipulation of objects. For older children "the most authentic research activity may take place in the spheres of reflection, of the most advanced abstractions, and of verbal manipulations (provided they are spontaneous and not imposed on the child at the risk of remaining partially uncomprehended)" (Piaget, 1970, p. 68).

Related to the emphasis on discovery learning, Ausubel states that Piaget stresses spontaneous or incidental experience over formal education in promoting cognitive development. Ausubel somewhat resolves the conflict by stipulating two types of readiness occurring within the individual: specific and general. General readiness reflects a cumulative product of genic effects, incidental experience, and learning in which subject-matter learning affects cognitive capacities in a general way. Specific or subject-matter readiness, in contrast, is based on acquiring prerequisites for particular learning. "Experience or learning *any* subject-matter produces general as well as specific *developmental* changes in cognitive capacity in addition to specific changes in subject-matter readiness" (Ausubel et al., p. 249).

Piaget also categorizes cognitive achievement along a general-specific continuum, particularly for the adolescent, albeit in a more structured manner than does Ausubel. Most general is the group-lattice structure of formal thought; most specific are task linked concepts emerging from work with Piagetian experiments. Formal operational schemata are intermediate in generality and can be applied across a range of problems (Flavell, 1963, p. 222). Therefore, a general cognitive structure indeed emerges for Piaget, but its formation is augmented by specific task-concepts of subject-area content.

Having distinguished between two levels of cognitive development, Ausubel continues by suggesting that appropriate school experiences can accelerate more general development, particularly that of transition from one level of operations to another. While Piaget concedes that some acceleration, albeit necessarily limited in extent, is certainly possible. Ausubel emphasizes the role of training and education. He is especially interested in the transition from concrete to abstract thinking. The general training procedure he describes takes place in anticipation of the next higher developmental period after the current stage is fairly well consolidated. To move from concrete to formal operations he suggests "gradually withdrawing the concrete-empirical props as the prior stage becomes consolidated—that is, by withdrawing the props well in advance of the actual attainment of abstract cognitive functioning" (p. 249-250). He concludes, "On theoretical grounds there is no reason why *only* incidental (spontaneous, undirected, unexplained) experience (despite Piaget's insistence to the contrary) must effect the gradual cumulative change in intellectual capacity that makes transition to a higher stage possible" (p. 248).

Again, despite Ausubel's insistence to the contrary, Piaget suggests a similar instructional approach. Because of the importance to Piaget of the key concept of gradual transformation of overt action into mental operations, Piaget

indicates that the teacher should assist this process by encouraging the student to work with progressively less direct support from the external givens (Flavell, 1963, p. 368). Ultimately, the external actions can take place internally and in complete autonomy from the environment.

Finally, in considering the concrete and abstract periods of cognitive development as well as the transition between them, Ausubel makes some distinctions between Piaget's thinking and his own that seem to differ more in emphasis than in substance. Without explicitly using Piaget's term *decalage*, Ausubel iterates that the movement from concrete to abstract functioning must occur separately in each discipline. He does hypothesize, however, that the general overall stage of development is transferable to the new discipline. This is due to "the existence of a larger body or 'critical mass' of stable abstractions in cognitive structure and of sufficient transactional terms for relating them to each other, as well as considerable experience in comprehending and manipulating abstract ideas without the benefit of concrete props in other disciplines" (Ausubel et. al., p. 206). Therefore, while the individual who has achieved formal thought must move anew through concrete to abstract reasoning in each new discipline, the process is greatly accelerated.

Furthermore, he identifies a different critical feature as the quality distinguishing between concrete and formal operations. For Piaget, this feature is that the more advanced child "is able to deal internally with ideas about ideas or to perform 'second order operations'" (p. 237). Ausubel modifies this view considerably by stating, "It is rather the preadolescent's and adolescent's ability verbally to manipulate relationships between ideas in the absence of recently prior or concurrently available concrete-empirical proofs that is the distinctive attribute of formal operations" (p. 237). He supports this premise by maintaining that concrete operational children can draw correct inferences from hypothetical premises involving abstract relations.

Ausubel recognizes a general similarity between Piaget's formulation of the assimilation process and his own assimilation theory. This similarity stems from the provision in Piaget's view of assimilation for the absorption of new into existing schemata which is generally analogous to subsumption. Ausubel quickly adds, however, that "not only does Piaget fail to go beyond this general statement of assimilation and describe explicitly how assimilation occurs, he also conceives of assimilation solely in terms of developmental progressions rather than in terms of a contemporaneous learning process" (p. 231).

Difficulties stemming from two different definitions of the same word—assimilation—exemplifies how confusing terminology overshadows some of the interrelatedness which actually does exist between the two theories. For instance, the two types of subsumptive learning, derivative and correlative, are roughly akin to assimilation and accommodation although the relation Ausubel identifies is between assimilation and subsumption. More formally, Ausubel's assimilation theory of meaningful learning involving progressive differentiation and integrative reconciliation appears to be analogous to adaptation with its complementary processes of assimilation and accommodation.

### IMPLICATIONS

The explication and comparison of the theories of Jean Piaget and David Ausubel indicate that the two cognitive theories are compatible and perhaps even complementary. From this assumption, pedagogic implications emerge particularly for the use of advance organizers in instruction.

Although the discoveries and technology of today's world are engendering an ever-accelerating movement towards tomorrow's reality, the bulk of the learning in the schools continues to be that of meaningful verbal materials. In fact, because of burgeoning knowledge, the amount of materials learned has increased exponentially. How to facilitate learning, retention, and transfer of meaningful verbal materials is a prime concern of education. Appropriately designed and implemented advance organizers appear to be one means to this end.

Moreover, Piaget posits that cognitive ability varies qualitatively with the developmental stage, suggesting that different types of instruction are more appropriate than others at specific developmental points. That carefully designed advance organizers have been proven to be facilitative in preoperational and concrete operational children is consistent with this position. The weight of the research evidence in support of these points gives credence to systematically using advance organizers in the classroom. (See Searls, Note 2, for specific guidelines.)

However, the scope of the research combining the two theoretical bases has been limited largely to work with young children and some serious methodological problems have been evident. Additional work needs to be undertaken with children of different age groups.

### Reference Notes

1. Lawton, J. T., and Ershler, J. *Effects of formal and informal pre-school programs on logical concept learning and development: An interim report*. Paper presented at annual meeting of the American Educational Research Association, Boston, April 1980.
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## REACTION: NIELSEN'S COGNITIVE COMPARISONS AND SEARLS' ADVANCED ORGANIZERS

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I was especially pleased to be asked to react to these two papers, because for the past several years I have been playing with Ausubel's notions of advance organizers and speculating as to why the research results have been so mixed and inconclusive. Laurie Nielsen has done a fine job of modeling her message and interpreting two difficult gentlemen, Ausubel and Piaget.

Refreshing my memory of Piaget's active model of stages of language development and relationships to thought processes one aspect seemed to stand out. It seems to me that Piaget's stages can have as much to do with the developmental sequences of mental operations in general as it does with age or level descriptions of cognitive processes. There is a sequence and we go through it at age 50 (when material is new and complex) as well as at age 10. We move rapidly or slowly from pre-operation or concrete to formal operations, depending upon the task, our purpose and our background of experiences.

I would further add a reminder of a suggestion made by Patricia Arlin (*Developmental Psychology*, Vol. 2, 1975, 602-606) that Piaget omitted a fifth stage which she termed "Problem-Finding." At this higher level we are pushed to creative thought, envisioning new questions and discovering new heuristics in adult thought.

This ties in with a problem that keeps surfacing all too frequently in my work with secondary and adult reading, and that is the ancient and absurd notion that we would not need secondary reading if elementary teachers truly did their jobs. How absolutely erroneous this is! Those who take this position are actually defining reading in the narrow sense of the early "learning to read" skills with emphasis on story reading, and forgetting the demanding tasks of technical content reading. They are neglecting theories of cognitive development beyond elementary years, ignoring the notion of reading maturity and the formal operations hierarchy. Indeed, in older more mature readers reading, thinking, studying are often indistinguishably intertwined.

Turning now to Ausubel and implications for the classroom and for teacher education, Evelyn Searles' paper has given us some practical applications to consider.

I agree with Searles that all ages can benefit from the use of advance organizers, and that material which readily lends itself to this technique is already written in a systematic fashion containing overall structure. I would suggest though that it is also possible and can be beneficial to use advance organizers with material not overtly containing this structure. You can impose a structure on literature, for example, with recognition of a story schema or the technique of flashbacks.

As we know, the *active* participant is the one who learns and benefits most. Teachers may welcome having advance organizers provided for their student in the text, but the best kind of written organizer comes from the teachers themselves who must go through the process of determining what *they* consider crucial to emphasize and what cognitive levels the students can handle successfully. What are their students' models for structuring knowledge or problem-solving? Let us do more in helping teachers learn how to develop their own advance organizers.

I also agree with the notion of using structured overviews because of the power of the visual/verbal connections where key terms are arranged in diagrams (e.g., mapping, semantic webbing) and students and teachers discuss the concepts. These overviews are beneficial when they simplify, encourage student interaction, explain, and refer to specific data.

Finally, conflicting research results concerning the efficacy of using advance organizers mean little because for the most part, vital components or crucial issues were often not addressed. What we do *not* know from these reports is far more influential than what we *do* know. Generally, we do not know:

- (1) what the makeup of text material was in terms of a need for an advance organizer in the first place. Was the structure already evident to the reader? Was the material too short or clearly written to need this aid?
- (2) whether the advance organizer met the three criteria of being more abstract (concentrated summary), more general (broader in scope) and more inclusive (comprehensive).
- (3) the learners' background information. At what cognitive level were they? Did they require an expository organizer (for new information)? Would a discourse or graphic organizer be best?
- (4) the intent and quality of the post tests. Did they measure the *product*, recognizing and recalling knowledge, or the *process*, such as ability to apply information to new situations. Did they measure immediate recall as well as retention and retrieval?

Let us not dismiss the use of advance organizers based on such existing incomplete data. Whether we agree or not as to the best form, anticipatory readiness activities of some sort are beneficial to most readers encountering new and difficult textual materials, and for that there should be little argument.

## READING RATE AS A FACTOR IN COMPREHENSION AT THE COLLEGE LEVEL

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Many college reading programs attempt to teach students to read rapidly. This rapid reading is intended to aid students in reading the volume of material required in college coursework. Such programs generally include comprehension checks after paced and non-paced reading. Of interest to the investigators was the relationship of rate to comprehension on college-level reading material, both after paced and non-paced reading.

This study is two-fold in that it examines the relationship of rate to comprehension on material read with a pacer, and it examines the same relationship on material read without the use of a pacer. Paired scores ( $N = 202$ ) were obtained during winter and spring quarters of 1980 in Reading 1000, a reading

and study skills course at East Tennessee State University. The instructor was the same for all students and classroom procedure was the same for all classes. Students read both paced and non-paced material alternately during class time and recorded rate and comprehension scores for each reading. Pacers used were SRA models.

## REVIEW

### Relating Speed and Comprehension

Blommers and Lindquist (1944) after surveying studies comparing reading rate and comprehension reported correlation coefficients between them ranging from  $-.47$  to  $.92$ . These correlational findings are not surprising, in that subjects were tested at many grade levels. Blommers and Lindquist investigated the relationship between rate and comprehension on tests developed to yield measures valid for such a study. They cited the following items as affecting reading rate: the nature of the material used—vocabulary load, sentence structure, difficulty, typographical features; the reader himself—his skills, habits, mental and physical state, etc.

In an earlier study, Judd (1916) concluded that high rate and good-quality of reading are commonly related and low rate and poor quality are commonly related. Based on five reading tests, Gates (1921) found a correlation of  $.84$  between composite reading rate score and composite comprehension score. He contended that in detailed individual analyses of cases there is a real and useful distinction between the terms "ability to comprehend" and "rate of reading." King (1916), however, in contrast to the other findings, obtained a correlation of  $-.47$  between the two. This disagreement seems to be a function of testing procedures, materials chosen, and reader characteristics.

Preston and Botel (1951) tested the hypothesis that speed and comprehension are unrelated. They found a statistically significant correlation ( $.48$ ) between rate and timed comprehension and a nonsignificant relationship ( $.20$ ) between rate and untimed comprehension. They concluded that tests of reading which include speed in the measurement of comprehension are invalid measures because speed and comprehension are relatively independent of each other. In studying the relationship between speed and comprehension when no time limits were introduced, Stroud and Henderson (1943) found the correlation of time and comprehension to be low and concluded that the factors were independent.

Shores and Husbands (1950) examined the hypothesis that faster readers were better readers on problem-solving material when a purpose was set for reading. They concluded that there is almost no relationship between speed and comprehension when (1) speed and comprehension are measured simultaneously using science material; (2) the purpose for reading is given in advance; (3) inferences are required before problem solving; and (4) critical thinking is required for comprehension. They contended that comprehension is less dependent on speed than on intelligence. Shores (1961) replicated their work and found that speed was influenced by purpose.

The manner in which comprehension is measured also affects the correlation between rate and comprehension. Letson (1958) found relatively high correlations ( $.46$  and  $.77$ ) between rate and correct number of items (on a comprehension measure) and a correlation of  $-.10$  between comprehension and the number of items attempted. He concluded that the relationship between speed and comprehension decreases as the difficulty of the material in-

creases.

Robinson and McCollum (1934) studied the upper 15% and the lower 15% of a group of students to determine the relative influence of rate and comprehension on reading test scores. They concluded that good readers score higher in both speed and comprehension but speed is the greater determinant of test scores. Comprehension questions covering higher levels of questioning favor good readers.

The measurement of speed and comprehension is a controversial issue. According to Davis (1962), "Number of words read per minute is, in itself, a meaningless score. To be meaningful, it must be associated with a score indicating the extent of comprehension that has been attained" (p. 30). Spache (1962) challenged the idea of multiplying the two scores for rate and comprehension as a measure of effective rate. Braam (1963), however, advocated such a practice.

There is evidence to support the hypothesis that a relationship between comprehension and rate may depend upon the nature of the test materials themselves. Tinker (1932) cited three research methods which were used to obtain rate and comprehension correlations. The first method compared the speed with which a text is read with the recall of the material. This comparison usually yielded low correlations. Tinker (1932) asserted that recall of this type is not comprehension; therefore, the correlations obtained were invalid. The second technique involved obtaining speed and comprehension scores from children who were reading different materials. Tinker (1932) criticized this approach because the subject matter differed from test to test and the correlations obtained measured "somewhat different combinations of the many functions involved in reading" (p. 159). The third method compared rate and comprehension on identical reading texts. These correlations were consistently high. Gates (1921) obtained positive correlations of  $.90$ ,  $.96$ ,  $.93$  and  $.88$  for grades 3 through 6, respectively. On an early test of reading, Paterson and Tinker (1930) found a corrected correlation coefficient of  $+1.00$ . Tinker (1932) concluded, "The only adequate method of discovering the true relation between speed and comprehension in specific reading skills is to measure rate and comprehension on the same or strictly comparable material" (p. 160). He further stated that there is a close "relation" between speed and comprehension in reading. In a later study, Tinker (1939) reported that the relationship between speed and comprehension decreased as difficulty increased, especially when tests required specialized information. He concluded that when textual content is within the reader's experiential background, speed and comprehension are highly correlated.

Gray (1925) summarized several investigations and concluded that the evidence indicated a positive correlation between speed and comprehension, that the correlation is variable, and that correlations are higher with children than with adults.

Eurich (1930) found a stronger relationship between a pre-reading test of information and reading rate than he did between reading speed and post-reading test of comprehension. This finding indicated that familiarity with the material affected correlations. The 26 correlations he reported had an average value of  $.31$ , indicating a low-to-moderate correlation between speed and comprehension. Thurstone (1944) reported correlations of  $.11$  on physical science material,  $.42$  on literary material and  $.44$  on social science material.

### Variables Determining Reading Rate

In an early study, Quantz (1897) defined the following variables in reading rate: visual perception, practice in



reading, power of concentration, mental alertness, complex reaction times and scholarly ability. O'Brien (1921) reviewed the literature on speed in silent reading and concluded that the following variables affect rate: practice in rapid silent reading, amount of vocalization, training in perception, subject matter difficulty, habits of eye movement, purpose for reading, concentration of attention, ability to grasp meaning, reaction time, visual imagery, recognition of the value of rapid silent reading, and desire to read rapidly.

Indications that visual and auditory processing time as well as memory may be variables in reading rate and comprehension have been found by several researchers. Geyer (1968) said, "Until recent years neurologists believed the visual system to be relatively simple . . . the reading process was conceived as a series of tachistoscopic presentations flashed to the brain by saccadic movements of the eye" (p. 45).

In a study by Katz and Wicklund (1971), good and poor readers were measured on word scanning tasks. They found that there was no significant difference in scanning rate. Results pointed to the conclusion that the process involved in simple reaction time did not account for good reading in scanning tasks.

Rogers' (1969) research suggested that poor auditory memory is a causal variable in reading retardation as measured in oral reading and that auditory memory can be influenced by reinforcement techniques. In contrast to the Katz and Wicklund (1971) findings, Traxier (1934) believed that some individuals have slow rates because of a lag in thought processing. Sutherland (1946) concluded that rate of reading and rate of perception are related to perceptual span.

The Holmes-Singer Substrata-factor Theory (Singer, 1965) of reading was designed to explain the mental structure and dynamics involved in reading ability. Singer (1965) asserted, "... general reading ability is an audiovisual processing skill of symbolic reasoning. This ability divides into two major interrelated components: speed and power of reading" (p. 1). Joined by short- and long-term memory processes, neurological subsystems may be mobilized to attain speed and power. These subsystems are identified as input (sensation and perception of stimuli), mediation (interpreting, inferring, and integrating ideas) and output (response formulation).

The speed of reading criterion to identify variance accounted for was assessed for the total sample as follows: auditing, 14%; visual verbal meaning, 18%; homonyms, 9%; reasoning, 8%; literary interest, 3%; unaccounted for, 45%.

The intelligence of the reader also seems to affect the correlation between speed of reading and comprehension. Carlson's (1949) research examined whether speed of reading is a unitary skill that can be acquired by some sort of pacing device, for example, or a complicated (and idiosyncratic) process acquired by each individual. He concluded that there is a tendency for less intelligent readers to read better at faster rates. He found that intelligence, readers' purposes, difficulty of material, continuity of text and opportunity to reexamine the text while answering questions also affected comprehension. There was an increasingly negative degree of relationship between rate and comprehension as material difficulty increased when middle and low intelligence groups were tested.

### Physical Constraints

Reading rate may not only be limited by processing time or memory but by the related physical constraints of the eye and its movement/fixation capabilities as well. Spache (1962)

observed that if a reader reads

... most of the words on a page, it is impossible to read faster than 800 to 900 words per minute. This fact derives from the amount of time necessary for (1) the shortest fixation (approximately 1/6 to 1/5 of a second during which reading occurs); (2) for the sweep or saccade to the next fixation (1/30 to 1/25 of a second); and (3) the maximum number of words that the eye can possibly see with a single fixation during the continuous reading (probably 2.5 to 3 words) (p. 262).

Taylor (1962) reported research of eye-movement studies and reported that through hundreds of studies involving eye-movement photography, it has been determined that no one has an average span that permits the intake of more than one word at a fixation. He quoted research which documented that the average span for the college student reading 280 words per minute is only 1.1 words. Pauk (1968) stated that there was no evidence that the mind can even deal with more than one word at a time.

Shores (1968) noted that the physical presentation of printed material may determine how rapidly one reads and how well one comprehends. He stated that these two variables may be affected by type, typestyle, legibility, and paper quality.

Much research has been directed toward the role of subvocalization or implicit speech in reading rate and comprehension. Betts (1950) believed that any form of vocalization or lip movement retards the rate of silent reading.

In contrast to Betts' opinion, several authors contend that vocalization appears to be an integral part of the reading process. Rose (1969) reasoned that acoustic rehearsal of stimuli is important in meaningful reading. Sperling (1963) asserted that utilization of items in reading is not limited by visual factors but by the rehearsal process to a rate of ten syllables per second or slower.

Both Smith (1971) and Huey (1968) felt that optimal reading rate is directly related to comprehension. Rankin's (1963) research suggested that comprehension may be dependent upon speed of reading among mentally competent readers.

### RESULTS

Pearson product moment correlations for rate and comprehension on paced and non-paced material were computed between the paired scores ( $N = 202$ ) obtained on both paced and non-paced reading selections. Results showed a strong correlational relationship (.52,  $p < .001$ ) between rate and comprehension on non-paced reading. Mean rate was 225 words per minute, and the mean comprehension score was 60.75%. A correlation of .08 was found between rate and comprehension on paced material and was not significant ( $p < .05$ ). Mean rate was 365 words per minute with a mean comprehension score of 40.67%. Mean difference in paced and non-paced comprehension scores on a  $t$  test for correlated data was found to be significant at the .001 level as was mean difference in paced and non-paced rate scores.

A scattergram of rate and comprehension frequencies by deciles provided information which was used graphically to illustrate the relationship between rate and comprehension for both paced and non-paced scores. Reading speed scores were divided into deciles, each category containing approximately 10% of the population. The exact limits and midpoints of each interval were calculated for the decile categories. Figure 1 illustrates the increasingly positive relationship between rate and comprehension which occurs up to the 225-250 words per minute range. After that range the relationship exhibits a change and a variation in rate does not seem to markedly

affect comprehension.

Figure 2 illustrates the relationship between rate and comprehension on paced material. There seemed to be little change in the relationship between rate and comprehension on paced material, and the representation was almost linear.

### CONCLUSIONS AND IMPLICATIONS

According to the results of this research, the relationship between reading rate and comprehension is not constant in non-paced material. Below approximately 250 words per minute there was positive and significant correlation between rate and comprehension, yet above that rate little or no relationship existed. At above 250 words per minute on non-paced material and on all paced material, a difference in comprehension must be accounted for by variables other than reading rate. It may be that interest or experience factors become determinants of comprehension, or that the pacing device itself may affect comprehension.

Also of interest is the question as to whether the pacing device contributed to higher rate scores on non-paced material, because students completed both types during each class meeting. Although the mean rate for non-paced was lower than that of paced material, the mean rate may indeed have been lower still had there been no paced practice. Further study is planned to investigate this question.

The investigators believe that the relationship between rate and comprehension depends upon the rate and comprehension ranges examined. In beginning reading, there is a change in the relationship at approximately 55 words per minute (Strader, 1975). It seems that the critical rate changes as the age and reading proficiency of subjects is varied.

This study leads only indirectly to instructional applications. As a result of this study more investigation into use of reading pacers will be instigated. Motivational aspects versus concrete data on pacer use may be questioned. The time constraint for reading definitely affected the relationship between rate and comprehension. However, confounding of the variables may have occurred in carry-over to non-paced material. Further investigation is necessary.

Figure 1

Graph Representing Relationship of Rate to Comprehension Scores on Non-Paced Materials

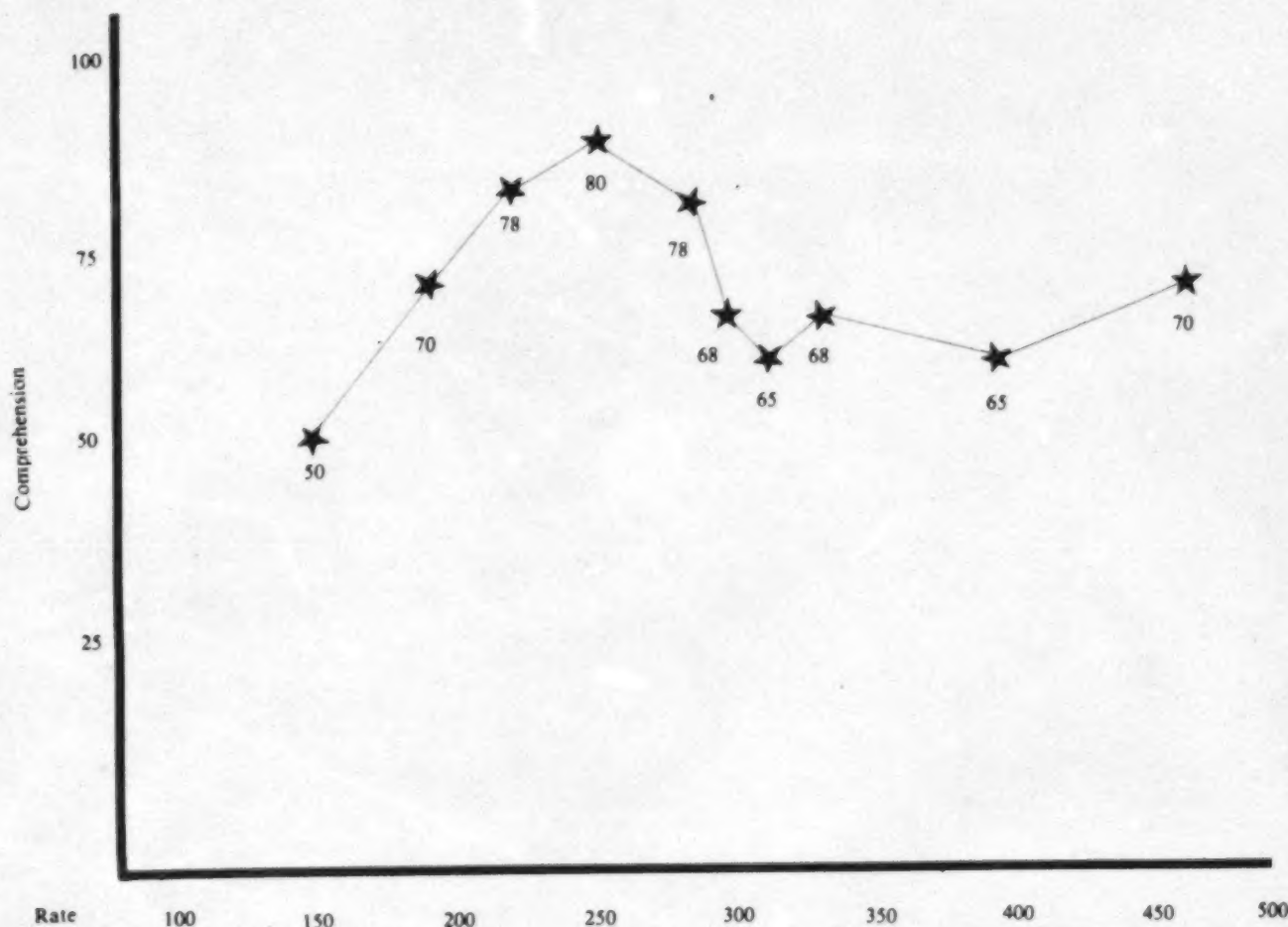
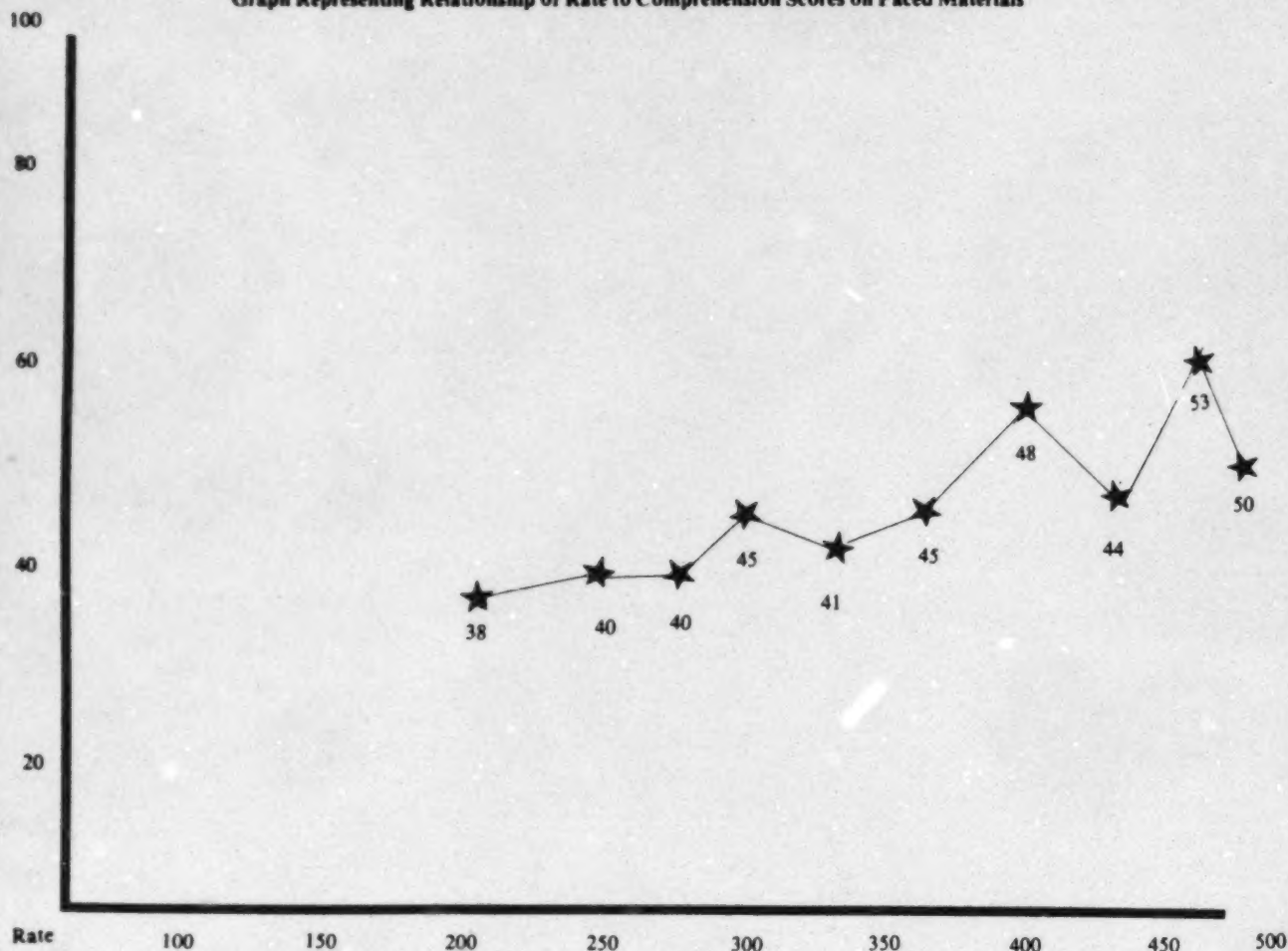




Figure 2

Graph Representing Relationship of Rate to Comprehension Scores on Paced Materials



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